THE IRON AGE

New York, December 13, 1928

ESTABLISHED 1855

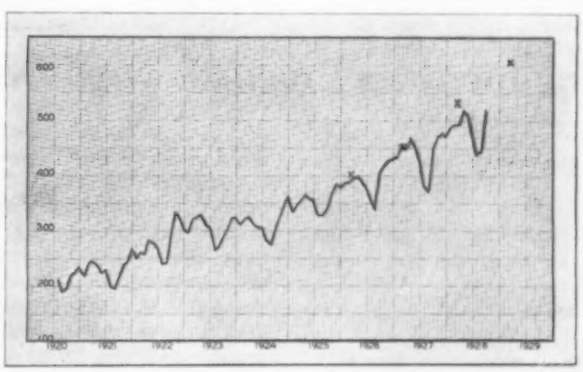
VOL. 122, No. 24

Business Forecasts Put to Practical Use

Telephone Company Applies General Industrial Curve and Supplementary Data to Manufacturing, Line Extension and Toll Service Needs

BUSINESS forecasting may be an inexact science, if it is a science at all, but in the opinion of the statisticians of the American Telephone & Telegraph Co. it is a valuable aid to the making of future business plans, whether it be used by a telephone system, a manufacturer whose distribution is country-wide or one whose trade is confined to certain sections.

Whatever the defects of business forecasting may be, the American Telephone & Telegraph Co. has employed it since 1921, not only for charting the probable course of telephone traffic over long-distance lines, but to determine the needs for new plant and equipment caused by shifting tides in business or increases in population or general industrial expansion.



THE Curves of Telephone Traffic and General Business Conditions in the Country Bear a Fairly Definite Relation to Each Other. The American Telephone & Telegraph Co. applies its general business curve, together with supplementary information, to various telephone circuits, forecasting with reasonable accuracy the probable traffic over a given circuit. In the same manner its forecasts are applied to its manufacturing department and to line and plant extensions. The curve reproduced was made in the spring of 1925, and it was borne out fairly well by events.

When a skyscraper rises in New York requiring several thousand new telephones, that is a matter for the local telephone company to solve, but when the Ford Motor Co. in Detroit resumed production after months of comparative idleness, there was an increase in long-distance traffic which had to be foreseen and provided for by the parent company.

Keeps Close Track of Business Developments

The curves of telephone traffic and general business conditions bear a fairly definite relation to each other, but in the opinion of the officials of the American Telephone & Telegraph Co. telephone traffic is not sufficiently sensitive to be regarded as a definite barometer of business. On the other hand, the business trend has a very definite effect on telephone traffic.

Therefore, the telephone system finds it necessary to keep very close to business developments, not only on broad general principles, but as they affect certain industries and certain sections of the country. For example, a boll weevil blight in the cotton growing sections of the South will have a decidedly unfavorable effect on telephone communication in that section. In cotton centers the traffic rises to a high point during the fall and winter, when cotton is being sold and shipped. A stiffening of rubber prices is bound to boost traffic on circuits to Akron, Ohio. Likewise, changes in the lead market quickly affect business over lines to Joplin, Mo.

The coal fields furnish examples of such transient developments. During the coal strike of 1922 there was sudden jump in traffic to points in the non-union fields, where mines were still operating, and a corresponding drop in traffic to the union fields. By the time the strike ended the shortage of coal had become acute, and for some weeks wires to both union and non-union fields were humming. When this condition in the coal supply had been remedied, the traffic fell to normal, in some cases nearly two years after the strike began.

In estimating the volume of telephone traffic, the telephone company gives consideration to three major elements: Past experience, economic factors and common sense. These elements enter into each decision in a varying degree. Not that the forecaster shows varying degrees of common sense from day to day, but in each case common sense dictates that a different weight be given to each factor.

Under ordinary circumstances, past experience has been found by the telephone company's forecasters to be a rea-

sonably reliable basis for prediction over a short period. It shows the seasonal variation and the normal growth of the traffic. The forecasting for long-distance service (which comes closest to the problem of the average manufacturer in shaping his policies) covers a period of one year, five years or greater periods, depending upon the use to which the forecasts are to be applied. The curve is projected into the period for which a prediction is desired. Suitable corrections are made for any factors which may conceivably influence telephone traffic. General business conditions throughout the country and in particular areas are taken into consideration.

Steel and Pig Iron Production Given Considerable Weight

Various business data are used by the statisticians of the telephone company. Steel ingot and pig iron production is given considerable weight, as are machine tool orders, car loadings, electric power consumption and such important indices of business trends.

Each autumn the associated operating companies of the Bell system draw up a detailed budget for the year just ahead and a somewhat less detailed but comprehensive forecast for the four succeeding years. In other words, a tentative five-year program is laid down, subject to annual revision. The budget for the year just ahead takes account not only of expected operating revenues and expenses, but also of capital needs, and goes into much detail in regard also to physical units of plant.

One of the earliest formal steps taken each year in carrying out the budget plan is the submission to executives of the Bell system of certain economic forecasts, of which the most fundamental is the forecast of general business. Each month the executives of the system receive from the statistical department a summary of business conditions, which not only reviews economic events and developments, but indicates the views of the statisticians as to the immediate future of general business. The annual forecast takes the form of a graphic projection of the general business curve. This curve, it is stated, is primarily a curve of fluctuations in industrial activity and follows fairly closely the Harvard Economic Society's curve showing the volume of manufacturing activity in the United States.

The American Telephone & Telegraph Co. does not base its forecasts on any business cycle theories; its statisticians give most weight to the most complete array of business and economic facts it is possible for them to obtain. These facts they obtain by reading and by outside contacts. By following this method they have reduced, they believe, the percentage of error. As a matter of fact, the telephone company's forecasts, which were begun in 1921, have made only one serious miscalculation, and that was for 1926. At that time the constructive elements which made 1926 such a big industrial year were underestimated and the elements which were apparently making for business recession were overestimated.

Adequate Lighting Increases Production and Decreases Accidents

THE importance of adequate lighting in the successful operation of industrial plants was emphasized by several speakers at a symposium on illumination, held jointly by the American Society of Mechanical Engineers and the Illuminating Engineering Society during the forty-ninth annual meeting of the A. S. M. E. at the Engineering Societies Building, New York, Dec. 3-7.

Adequate lighting will increase production, decrease accidents, reduce labor turnover and spoilage of work and assist in maintaining the health of employees, said C. C. Munroe and H. A. Cook, Detroit Edison Co., in their paper on "Light as a Factor in Production." An average increase of 15 per cent in output with increase in cost of lighting of approximately 2 per cent of the payroll cost was said to have followed the installation of a new lighting system in nine plants, most of which are metalworking. A saving of $30,000 in spoilage on one operation in a large body-working plant is credited to installation of an improved lighting system.

In an adequately lighted plant the intensity is sufficient to enable the operator to perform his work with speed and accuracy. No glaring light sources are present to blind him temporarily or to produce undue eye fatigue; his vision is clear and unhampered, making efficiency possible. Spotted illumination has been eliminated, so the necessary adjustments of the eye are not as great as formerly, thus making it possible for him to work throughout the day without the strain caused by adverse conditions.

When the intensity of illumination is too low to permit quick discernment of necessary details, when glare is present due to bright light sources or reflections in the field of vision, and when the distribution of light in the working area is such that sharp contrasts of intensity are present, the lighting is inadequate.

Advocates Reserve Wiring Capacity in Installing Lighting System

Reserve wiring capacity in designing a lighting system was stressed by Ward Harrison, director of illuminating engineering, National Lamp Works of the General Electric Co., Nela Park, Cleveland, in a paper on "Artificial Lighting Provisions in Building Design and Process Layout."

"Considerable ultimate economy will usually be effected if a certain factor of safety is provided in the wiring," he said. "That is, the copper is made heavy enough to carry a lighting load of approximately 4 watts per sq. ft., even though the immediate requirements for light may not be for more than half this amount. Obviously, also, the outlets should be spaced close enough together to provide reasonably uniform illumination over the working surface. This cannot be done by spacing them on 20-ft. centers with any ordinary ceiling height. With a 20-ft. spacing and lighting units 10 ft. above the floor (about 7½ ft. above the work) the variation in illumination between points directly under a lamp and those half-way between lamps is of the order of 4 to 1."

A graph showing the wiring installation costs per outlet, from data obtained in 11 cities, indicated that on the average the original installation expense is increased only 28 per cent when the wiring capacity is doubled, whereas to make this change after the building is completed and wired will usually much more than double the cost.

Use of 300-watt lamps on 10-ft. centers was said to be considered an excellent standard of general illumination. In discussing special lighting problems, Mr. Harrison stated that as industry becomes more established the trend will probably be toward specialized lighting for many processes. "With the present frequency of industrial changes, however, it will often be found less expensive to provide for a very high level of general illumination over the entire area, and thus avoid the necessity of varying the type and location of lighting equipment for each change of process or department location in a given plant," he said.

Another paper at this session was "Desgining Buildings for Daylight," by H. H. Higbie, professor of electrical engineering, University of Michigan, Ann Arbor, Mich., and W. C. Randall, chief engineer, Detroit Steel Products Co. M. C. Huse, general sales manager, Philadelphia Electric Co., Philadelphia, and president of the Illuminating Engineering Society, presided at the symposium.

Economic Analysis of Jigs and Fixtures

Simple Formulas Developed to Help Solve Tooling Problems—Applicable Also to Punches, Dies, Special Equipment and Machine Tools

BY JOSEPH W. ROE*

THE first and most important element, which applies to all forms of work-holders, is the economic one. A certain amount of "tooling up" is an advantage wherever parts are to be produced in quantity, but how far it should go and how much capital should be tied up in special fixtures and tools depends on immediate conditions.

The question of the amount of expense justified has been handled largely on the basis of judgment. The besetting sin of the tool maker is to tie up money in fixtures which may show a heavy saving when in use, but are seldom used. A saving of 5 per cent in labor cost on a job in constant use might justify greater expense in fixtures than a saving of 90 per cent on a small job coming through only once or twice a year. Other factors besides saving in time and labor expense are involved, such as the life of the fixtures, due not only to their own wear, but to possible obsolescence of the article they make. Fixtures may be desirable even where only small quantities are involved, but the economic advantage of lower labor costs is the controlling factor unless some other consideration, such as improved interchangeability, increased accuracy, or reduction of labor trouble intervenes. Usually, where these latter reasons alone would have necessitated a fixture, it is found that the fixture lowers costs.

In the books available on work-holding devices are to be found methods of construction, much on the details, and examples of good practice in design, but almost nothing on the economics of the subject. It should be the first consideration and is usually given little thought. Few plants give to their fixtures the searching economic analysis which they apply to their power equipment. Until recently, the same has been true for materials-handling equipment; but thanks to the materials handling division of the A. S. M. E. formulas are now available, and are being increasingly used, which provide a standard basis for the economic analysis of equipment in that field and for determining the probable profit on any proposed installation for given costs and performance. These formulas take into account interest, depreciation, obsolescence, and other items of overhead which theretofore had been either neglected entirely, or had been handled differently by every one concerned. They can be used, with modifications and simplifications, for tool equipment just as well as for materials-handling equipment, and should be.

The following is a suggested adaptation of them for this use. Certain factors in the materials-handling formulas which are important in installations in that field are of less importance in dealing with fixtures or may drop out entirely. Others, such as the interest rate, taxes, etc., may be taken as constant and brought together. This permits simplification.

With fixtures, as with other types of equipment, depreciation is made up of two factors, deterioration and obsolescence. As a rule these do not bear equally. In one case deterioration due to wear may be the chief factor. More often obsolescence due to liability of change in models or design may control. That one should be used which operates the faster.

Fixture Problem Centers on One or More of Four Items

In dealing with fixtures, the economic problem centers on answering one or more of the following questions:

1.—How many pieces must be run to pay for a fixture of given estimated cost which will show a given estimated saving in direct-labor cost per piece? For instance, how low a run must we have to justify a fixture costing $400 which will save 3c. on the direct-labor cost of each piece?

2.—How much may a fixture cost which will show a given estimated unit saving in direct-labor cost on a given number of pieces? For instance, how much can we put into a fixture to "break even" on a run of 10,000 pieces, if the fixture can save 3c. on the direct-labor cost of each piece?

3.—How long will it take a proposed fixture, under given conditions, to pay for itself, carrying its fixed charges while so doing? For instance, how long will it take a fixture costing $400 to pay for itself if it saves 3c. on the direct-labor cost per unit, production being at a given rate?

Questions 1, 2, and 3 assume that we just break even. There is also the very practical question: 4.—What will be the profit earned by a fixture, of a given cost, for an estimated unit saving in direct-labor cost and given output? For instance, what will be the profit on a $200 fixture if it will save in direct-labor cost 3c. a piece on 10,900 pieces?

These questions involve something more than the simple arithmetic which seems all that is necessary for answering them, because, while the credit items for the fixtures depend mainly on the number of pieces machined, the debit items involve time, and also the number of set-ups required, i.e., whether the pieces are run off continuously or in a number of runs.

An important time element is that many companies now require that any new equipment shall pay for itself in a certain period. Investigations by the *American Machinist* and *Manufacturing Industries* show wide variation in practice as to this requirement, ranging from one to six or seven years, the longer period being used by railroad shops which have a stable class of work not liable to rapid obsolescence. The general practice seems to be about two years, but conditions even within one shop might warrant lengthening or shortening this period for different specific cases.

Proposed Formulas

The formulas reduce to the simple and workable forms found in equations [6], [7], [8], and [9] which follow, but

*Professor of industrial engineering, New York University. The article is taken from Professor Roe's paper, "Principles of Jig and Fixture Design," presented Dec. 3, at New York, before the American Society of Mechanical Engineers. The paper also includes a statement of the general principles of design and use of jigs and fixtures.

to use them correctly it is necessary to have clearly in mind the meaning of the symbols used.

Let N = number of pieces *manufactured per year*

Debit Factors

A = yearly percentage allowance for interest on the initial investment. (If the interest be taken on the *depreciating* value, this becomes, under uniform depreciation for n years,

$A \times \frac{1}{2}\frac{n+1}{n}$, the value of which decreases from A, for one year, and approaches $A/2$ as n grows large. For a life of two years this is $3A/4$, for three years it is $2A/3$. In the following formula either the original cost or the depreciating value can be used with equal facility. It is recommended, however, that one or the other basis be used uniformly to facilitate comparisons)

B = yearly percentage allowance for insurance, taxes, etc.

C = yearly percentage allowance for upkeep

$1/H$ = yearly percentage allowance for depreciation and obsolescence on the basis of uniform depreciation where H is the number of years required for amortization of investment out of earnings

E = yearly cost of power, supplies, etc., consumed, in dollars. (When the equipment under consideration is wholly new, this item appears in full. When it replaces old methods or equipment, the difference only is used. It is a debit if the E on the new equipment exceeds that on the old. It is a credit if the new E is less than the old. E in the formula may therefore be + or —.) In many cases, with fixtures this item is small and may be disregarded

I = estimated cost of the equipment or fixture, i.e., cost installed and ready to run, including drafting and tool-room time, material and tool-room overhead, in dollars

K = unamortized value of the equipment displaced, less scrap value, in dollars. Note: In the case of fixtures for new work, K drops out

$YCSU$ = Yearly Cost of Set-Ups, in dollars. This should include the time required for taking down the apparatus and putting machine into normal condition. In some plants with departments large enough to employ several tool setters regularly this time can be included in the department overhead. In this case this factor disappears as a separate item.

Credit Factors

S = yearly saving in direct cost of labor, in dollars
= N (old unit labor cost, minus the new unit labor cost)
= N (saving in unit labor cost)
= N ($SULC$) using initials as a mnemonic symbol. This covers *direct* unit labor cost only

T = yearly saving in labor burden, in dollars
= St (t is the percentage used on the labor saved)
= N ($SULC$) t

(Note: The latest form of the materials-handling formulas breaks this into T_a = burden on labor saved and T_b = burden on the equipment displaced. For use with fixtures the latter element may usually be disregarded for simplification.)

U = yearly saving or earning through increased production in dollars
= saving in unit labor cost × increased *yearly* production capacity
× the percentage of that increased capacity which will be utilized
× $(1 + t)$ (this cares for the burden saved)
+ cost of extra old equipment which would be necessary to care for the increase if the improvement were not adopted

(Note: In many cases U may drop out.)

V = yearly net operating profit, in excess of fixed charges, in dollars.

Proposed Formulas

If we just "break even" we have: The yearly operating savings = total fixed charges per year. Using the above symbols

$(S + T + U - E)$—Yearly Cost of Set-Ups
$= I\,(A + B + C + 1/H) + KA$

Since

$S + T = N(SULC) + N(SULC)\,t = N(SULC)\,(1 + t)$

Then

$$N\,(SULC)\,(1 + t) + U - E - (YCSU) = I\,(A + B + C + 1/H) + KA \quad \ldots\ldots [1]$$

To find the number of pieces required for a given cost I we have, solving for N,

$$N = \frac{I\,(A + B + C + 1/H) + (YCSU) - U + E + KA}{(SULC)\,(1 + t)} \quad \ldots\ldots [2]$$

To find the cost I which will just earn fixed charges we have, solving equation [1] for I,

$$I = \frac{N\,(SULC)\,(1 + t) - (YCSU) + U - E - KA}{(A + B + C + 1/H)} \quad [3]$$

To find the net operating profit over all fixed charges we have

V = gross operating profit, less set-ups and fixed charges
$= N\,(SULC)\,(1 + t) - (YCSU) - I\,(A + B + C + 1/H) + U - E - KA \ldots\ldots [4]$

To find the time H in years for the fixture to just pay for itself, the net profit V in equation [4] = 0

Therefore, setting the right-hand side of equation [4] equal to 0 and solving for H, we have

$$H = \frac{I}{N\,(SULC)\,(1+t) - (YCSU) - I(A+B+C) + U - E - KA} \quad \ldots\ldots [5]$$

In most cases it will be found that U, E, and KA may be neglected, so that equations [2], [3], [4], and [5] may be written as follows:

$$N = \frac{I\,(A + B + C + 1/H) + (YCSU)}{(SULC)\,(1 + t)} \quad \ldots\ldots [6]$$

$$I = \frac{N\,(SULC)\,(1 + t) - (YCSU)}{(A + B + C + 1/H)} \quad \ldots\ldots [7]$$

$$V = N(SULC)\,(1 + t) - (YCSU) - I\,(A + B + C + 1/H) \ldots\ldots [8]$$

$$H = \frac{I}{N\,(SULC)\,(1 + t) - (YCSU) - I\,(A + B + C)} \quad \ldots [9]$$

To be of practical value the formulas should be as simple as possible and yet reflect the essential conditions, and should be easily applied.

Equations [6], [7], [8], and [9] meet this condition for most fixtures. They take into account the number of pieces manufactured, the saving in unit labor cost, the overhead on the labor saved, the cost and frequency of set-ups, interest on investment, taxes, insurance, upkeep, and depreciation. The fuller formulas, equations [2], [3], [4], and [5], take into account, in addition to the above, the value of increased production capacity, cost of supplies and extra power, and interest on equipment displaced, if it is deemed that conditions require their consideration. These may be used for the more elaborate fixtures and for analyzing the purchase or building of machine tools.

In using the formulas it must be remembered that N is the number of pieces manufactured in a *year*, not per run, except for the case of a single run of less than one year's duration.

The items A, B, and C, once settled upon, need change little. If the plant has the practice of requiring new equipment to pay for itself in a definite time H, say two years, the depreciation $1/H$ may be added to the other carrying

charges, making a single percentage factor for the term $(A + B + C + 1/H)$ which can be used until the management deems that changed conditions require modification.

Examples of Economic Analysis of a Fixture

To illustrate economic analysis of a fixture by the use of these formulas, assume the following data:

Estimated unit saving in direct-labor cost	= 3c.
Burden on labor saved	= 50 per cent
Estimated cost of each set-up	= $10
A	= 6 per cent
B	= 4 per cent
C	= 10 per cent
H	= 2 years
$1/H$	= 50 per cent
$A + B + C + 1/H$	= 70 per cent

If I = $400, to find the number of pieces to be put through each year in one run per year, we have from equation [6]

$$N = \frac{\$400 \times 0.70 + \$10}{\$0.03 \times 1.5} = 6450 \text{ pieces}$$

That is, if a $400 fixture is to pay for itself in two years and carry overhead, with a single run per year 6450 pieces must be put through each year.

If, instead, the pieces are put through in six runs per year, then

$$N = \frac{\$400 \times 0.70 + \$60}{\$0.045} = 7550 \text{ pieces}$$

That is, more pieces must be run per year, due obviously to the increased number of set-ups.

There is of course a breaking point where it pays to have multiple runs, even at a higher production cost per piece, due to the balancing of production costs and fixed charges on increased inventory. Formulas are available elsewhere for determining this economic length of run.

Suppose the fixture is to pay for itself in a single run, how large must that run be?

In this case H is unity, as the fixture must pay for itself within the year, and $A + B + C + 1/H = 6\% + 4\% + 10\% + 100\% = 120\%$ then

$$N = \frac{\$400 \times 1.20 + \$10}{\$0.045} = 10{,}900 \text{ pieces}$$

This says that a smaller *total* output is required than when 6450 pieces are called for, for *two* years, or 12,900, due to one less set-up and carrying the overhead for only one year instead of two.

It will be noted that this assumes the full-year values for A, B, and C. If the run is short and it is felt that this is too drastic, the values could be cut down in the proportion of the actual running time to one year. It would be safer and therefore good practice to use the yearly rates, as the time for the complete turnover of the money going into the fixture is hard to determine and certainly is longer than the mere run itself. The cost of short-lived equipment should be extinguished as soon as possible.

Reversing the above assumptions, how much money could we put into a fixture for a single run of 10,900 pieces at an estimated saving of 3c. per piece? From equation [7]

$$I = \frac{10{,}900 \times \$0.045 - \$10}{1.20} = \$400$$

Similarly, if we want 7550 pieces a year in six runs per year, and want the fixture to pay for itself in two years, we have from equation [7]

$$I = \frac{7550 \times \$0.045 - \$60}{0.70} = \$400 \quad \ldots\ldots [10]$$

If we want to know the reverse of this, namely how long a time it would take a $400 fixture to pay for itself, we have from equation [9]

$$H = \frac{\$400}{7550 \times \$0.045 - \$60 - \$400 \times 0.20} = 2 \text{ years}$$

From equation [10] we see that we would "break even" with a cost of $400. Suppose now we can design a fixture for the same conditions which would cost $250 instead of $400 what will be the *profit?* Using equation [8] we have, for 7550 pieces per year in six runs per year

$V = 7550 \times \$0.045 - \$60 - \$250 \times 0.70 = \$105$ per year

For a *single* run of 10,900 pieces the profit would be

$V = 10{,}900 \times \$0.045 - \$10 - \$250 \times 1.20 = \$180.50$

Formulas [3] and [7] may be used to help in deciding between two fixtures of different degrees of refinement for the same job. For instance: For a single run of 2000 pieces, under the above conditions, how much can we afford to put

(*a*) Into a fixture if it will save 3 cents per unit, with a set-up cost of $10 or

(*b*) Into a more refined fixture which will save 5 cents per unit, with a set-up cost of $15

We have from equation [7]

$$\text{For } (a)\ I_a = \frac{2000 \times \$0.03 \times 1.5 - \$10}{1.20} = \$66.66$$

$$\text{For } (b)\ I_b = \frac{2000 \times \$0.05 \times 1.5 - \$15}{1.20} = \$112.50$$

Obviously also the same formula may be used to compare the amounts which might be put into fixtures for different lengths of run.

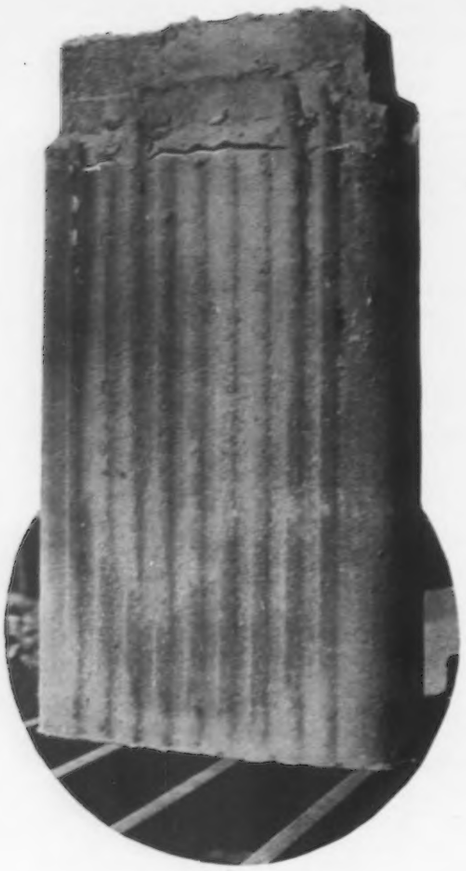
The above examples show how the formulas proposed may help in deciding tooling-up problems as they arise. They apply not only to jigs and fixtures but to punches and dies, special tool equipment, and, in the fuller forms, to proposed machine tools.

Nickel-Chromium Resistance Wires

A STUDY of nickel-chromium alloys, containing up to 60 per cent chromium, with or without tungsten or molybdenum up to 20 per cent has been made by C. J. Smithells, S. V. Williams, and J. W. Avery, and reported to the (British) Institute of Metals. They are solid solution alloys up to the following approximate limits: 45 Cr, 55 Ni; 20 Cr, 70 Ni, 10 W or Mo; 10 Cr, 75 Ni, 15 W or Mo. With more chromium in the binary alloy, or more tungsten or molybdenum in the ternary alloy, a second phase causes it to become unsuitable for resistance wire.

Alloys were made of mixed powders, melted in a tube furnace under hydrogen in a magnesia boat; double melting gave sound ingots. Solid solution alloys could be readily rolled, swaged or drawn to 0.375-mm. wire.

Relative merit was determined by electrically heating a short coil to 1100 deg. C., and noting the life in still air. It was found that at least 20 per cent chromium in the alloy was necessary, that the scale produced on the surface should be adherent and protective. The best life under continuous heating was given by the 20:70:10 Cr:Ni:W alloy; the best for intermittent heating by the corresponding analysis with molybdenum. It was also found that alloys made with electrolytic nickel were markedly superior to those made with reduced nickel, or to commercial resistance wires of the same nominal composition. Data are contained in the paper on the electrical resistivity of the wires, and on the variation of this property with changes in temperature.



Making Large Plates of Alloy Steel

Avoid Splashing During Teeming and Chilling During Stripping—Chipped Slabs Are Cleaned of Scale in Rolling Process

At the Montreal Meeting of the American Society for Steel Treating the physical properties of the 3-per cent nickel steel plate used for locomotive boilers by the Canadian Pacific Railroad were described (see THE IRON AGE, Feb. 23, page 536). The manufacture of such plates was discussed by Charles McKnight and W. G. Humpton,* before the American Society of Mechanical Engineers, Chicago, Nov. 14. Their paper deals with steels having nickel between 2 and 3 per cent without other alloying elements, manufactured into large plates between ¼ and 1½ in. thick. In general, however, the practice is applicable to other alloy steels and other sizes.

Manufacture of Steel

During melting it is only necessary to use ordinary precautions to insure a good sound steel. Nickel is introduced by nickel steel scrap, and by adding metallic nickel. It is not oxidized during the heat. Either the acid or basic process may be used. The open-hearth furnaces themselves are conventional in every respect, of from 50 to 100 tons capacity, fired with oil or gas.

First and most important is the killing of the steel, since blowholes in the ingot do not weld up satisfactorily. This is accomplished by the addition of silicon, manganese and aluminum to the bath or ladle.

Ingot Practice Exacting

Utmost care and minutest precautions during casting are amply repaid in fewer defects and less rejections. An ingot of satisfactory size for plates is 48 in. x 21 in. x 19,000 lb. with a hot-top. About 3000 lb. of metal will be cropped from the top.

Aside from the hot-top, the design of the mold (taper, wall-thickness and proportions) is most important. A mold with fluted walls, making the ingot shown, gives excellent results.

The greatest number of rejections after rolling are due to imperfections originally in the ingot surface. Consequently the greatest care is necessary in pouring to avoid such defects as splashes, laps, stop-pours and mold-pulls. Bottom-pouring is thought by some to result in a superior ingot surface, but it has at least two objections. First is the complication of setting up bottom-plates and runners and later cutting away these sprues. Second, refractory material is often cut loose from the runners by the stream of molten steel. Such an inclusion in an ingot is often more serious than the minor surface defects the process is supposed to eliminate.

Therefore, while bottom-pouring has been largely employed on deck-plate armor of this analysis, the recent trend is toward top-pouring with due care to avoid splashes. One scheme is to place a stove pipe of blue annealed steel in the center of the mold before pouring. This catches the splash, and melts quickly in the rising metal.

Mold washes are also employed by some, either the simple tar smoke coating, a tar or lime wash, or a wash containing flake aluminum. The latter has the added advantage of eliminating any small surface blowholes through chemical action.

Stripping and Reheating

As soon as it solidifies throughout it should be stripped from the mold. This should be done in the soaking pit building where the tender outside surface will be protected from chilled air, and it can be placed immediately in a pit. The latter should remain approximately at the temperature of the ingot for an hour or more, to equalize the hot interior and the cold exterior of the metal. Then the pit should be gradually heated to 2150 deg. Fahr. with a smoky flame. If the ingot gets too hot or an oxidizing flame is used, the original scale on the ingot will fall off and it will be extremely difficult to clean the plate during rolling of the second scale which forms.

An ingot of nickel steel should not be allowed to become cold until after some work has been done on it.

Rolling and Cleaning

It is essential to clean the plate during rolling. This is best accomplished by high-pressure water, salt and old burlap soaked in brine. The water is directed from a series of jets at the surface of the plate as it passes through the rolls; the salt is applied at any time during the rolling and quite generously during the last few passes, while the brine-

*Metallurgists International Nickel Co. and Lukens Steel Co. respectively.

soaked burlap is thrown by men, especially stationed for that purpose, in such a way as to hit the spots which need cleaning just as the rolls strike them. Care and attention are productive of better results than the choice of cleaning materials.

Such methods, used for many years in the production of protective deck-plate, have the defect of cleaning only the top surface. The Lukens company uses the very simple device shown to turn the plate over on the tables during rolling, whereby both top and bottom surfaces may be observed and cleaned.

The process of rolling at the plant just mentioned is as follows: The heated ingot is first given one or two passes in a longitudinal direction to "sadden" the ingot. It is then cross-rolled for width. When the ingot is reduced about half in thickness and to a size suitable for reheating, it is cooled and inspected. It is then chipped with pneumatic chisels to remove serious surface defects, although often the entire top and bottom surface is planed off—an expensive treatment which is frequently justified.

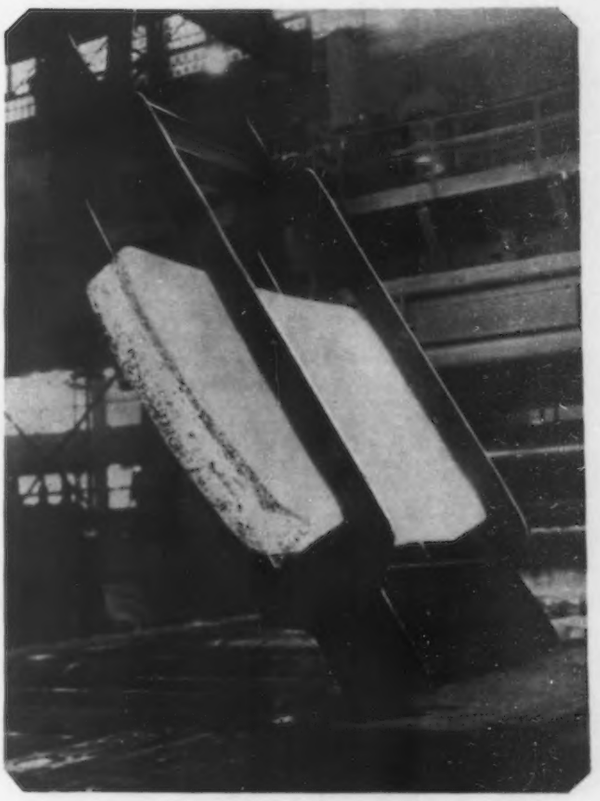
Cleaned slabs are then carefully reheated and finish-rolled on a four-high reversing mill. When the plate has been subjected to the heavier drafts and after the top surface has been cleaned by the use of burlap and salt, as above described, it is turned over so the bottom surface can be cleaned while rolling is completed.

Flattening and Heat Treating

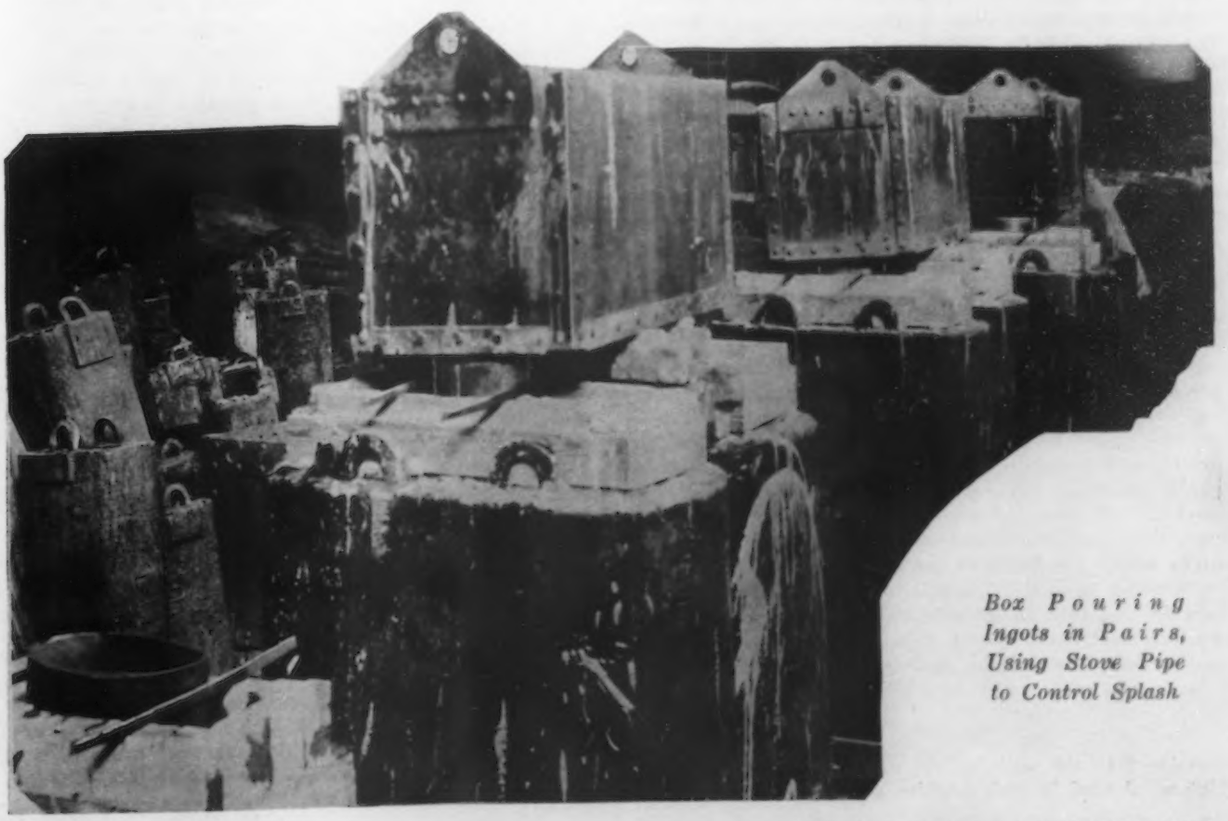
Since alloy steel plate hardens when cooled rapidly from the last pass, the quenching effect of the flattening rolls makes important changes in the tensile properties of the cold metal.

Generally speaking, the best combination of physical properties in nickel steel plate is obtained if it is finished at a good red heat (1450 to 1500 deg. Fahr.) and allowed to cool slowly through the critical range on the cooling bed by piling one plate on top of another or by taking them off the beds, piling and covering with sand. Restraightening is done later.

There is a growing conviction among users that plates, even of carbon steel, may be more safely and efficiently used if normalized prior to use. It is not known that this heat treatment is being given, except sporadically, by any mill, but the authors believe that sooner or later all plants will be equipped with furnaces sufficiently large to heat-

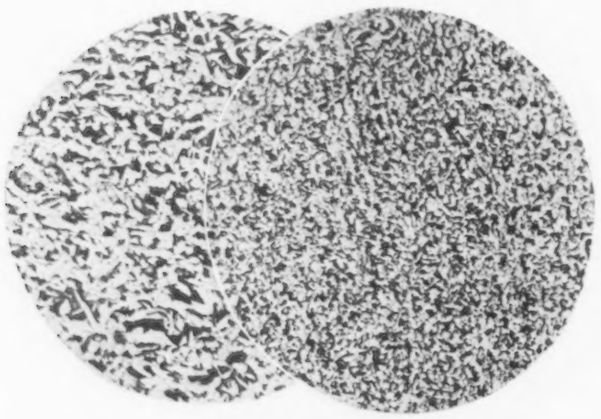


Cradle Engaged in Turning Slab, to Clean Under Side



Box Pouring Ingots in Pairs, Using Stove Pipe to Control Splash

treat all plates. While both the manufacturers and users of alloy steel plate will be benefited by such practice, it is more of a refinement than a necessity. It is of interest to note that nickel steel plates for the latest locomotives were ordered normalized after rolling.



Micro Structure of 3 Per Cent Nickel Steel Boiler Sheet, 273 x 145 x 13/16 In. 100 diameters. As rolled and after being normalized

Defects an inspector looks for are "snakes," pits and embedded scale. "Snakes" (long, wavy surface seams of slight depth) are the hardest to control. Careless pouring and stripping seem to cause most of them.

When they occur, they must be ground out. This practice has been permitted by the United States Navy for a number of years, but it is unacceptable to some purchasers of boiler plate. If the snakes are not too long, an abrasive wheel may be used of diameter sufficiently great so the trough ground out will have no sharp corners. To be sure the defect is removed, the clean ground surface should be etched with a 50-per cent solution of hydrochloric acid. If no trace of the seam remains after this treatment and the plate is not reduced in thickness beyond permissible limits, it should be considered good delivery.

Testing

Killed steel is very uniform and shows little difference in the tensile tests taken from the top or bottom; the transverse strength and the longitudinal strength are also about the same. "Open" steel, however, which, from its nature, is a segregating steel, will show considerable variations in these positions. By the same token, the variation in analysis in different parts of the plate or ingot of killed alloy steel is much less than in ordinary carbon steel.

Microscopic examination is rarely called for by the purchaser. The main defects which show up under such examination are laminations and large grain. The latter is due to high finishing temperatures and is not important if the steel successfully passes the tensile and bend tests.

Laminations are of two kinds. The first is due to a segregation of the pearlite and ferrite constituents of the steel into layers; this is quite common in all plates, and is probably due to more rolling in one direction than in another. It is rarely a serious defect. The other is an actual separation of the metal and is usually caused by incomplete cropping of the plate, so that a portion of the pipe remains.

What Will Carbide Tools Do to Machine Tool Design?

DR. S. L. HOYT, research laboratory General Electric Co., presented a short paper entitled, "Carboloy and Tungsten Carbide Tools," before the American Society of Mechanical Engineers. It is supplemental to a similar one before the Steel Treaters' Philadelphia meeting (see THE IRON AGE, Oct. 18, page 959). It will be remembered that Carboloy is an excessively hard composition made by mixing about four parts powdered tungsten carbide with one part cobalt, pressing to shape, and sintering in a vacuum furnace. It is used as an inset at the cutting edge of the tool; the joint is made by "coppering" the bit into a slot milled into a nickel steel shank. (The process is described in THE IRON AGE, May 10, page 1305.)

Grinding is done by a light pressure on a dry carborundum wheel; limits of half a mil may be had by lapping with boron carbide powder. Such lapping is necessary to make keen edged tools for finishing cuts.

Most of the tools made so far have been used on such non-metallic abrasive materials as indicated by the following: On Bakelite, Dr. Hoyt says, it does 70 times the work of high-speed steel before regrinding is necessary. In turning soft porcelain insulators the Carboloy lasts indefinitely, and it has changed this work from a hand job to a machine. On fiber the best speed for surface finish is too high for satisfactory endurance of high-speed steel, but easily within the ability of the new tools.

Working on metals it satisfactorily cuts tough aluminum bronzes, and hard manganese steel castings. On ordinary machine steel, plain or alloy, it is most useful on such work as can be cut with light feeds at a very high speed—in other words, under conditions which put moderate pressures on the somewhat fragile tool.

Most of the discussion on the paper was based on the premise that the carbide tool materials would supplant high-speed steel in such machine work as is now done on steels and cast iron. E. F. DuBrul, general manager National Machine Tool Builders Association, Cincinnati, said that an extensive fundamental research should be immediately organized if we are to determine the limiting capabilities of carbide tools, so that machine tool builders could have the necessary data wherewith to design equipment powerful and fast enough. Even though such an investigation would cost several hundred thousand dollars, this figure would be much less than the total cost of reaching the same point by a number of intermediate designs. Furthermore since the users of the new equipment would be the chief beneficiaries, they should be expected to underwrite the bulk of the investigation.

A. L. De Leeuw, consulting engineer, New York, however, was doubtful whether the present type of lathe or boring machine could ever be speeded up to the limit of the new tool. He therefore visualized an entirely different type of machine, where the work moved with moderate speed, but a well balanced tool holder, with multiple cutters, moved at extremely high speed. The forerunner of such equipment is now the grinder, but in this tool the cutters are of haphazard shape and setting, so that only a minute proportion of the cutting grains work efficiently.

Taking a more conservative view, E. J. Kearney, secretary Kearney & Trecker Corporation, Milwaukee, pointed out that the high speeds available with carbide tools are useful only to firms which have acute problems of mass production. Since such problems are now solved by installing special machine tools, it will require no undue waste to build others for the new tools with proper speed, power and rigidity. On the other hand, there will always be a large use for machines using high-speed steel at slower speeds, and for universal machines, just as there are now still in use in jobbing shops thousands of lathes dating back to the last century, before high speed was developed.

Introducing an Incentive Plan

Care Must Be Taken to Gear Up Plant and Personnel to New Wage Method—How the Dyer System Works

BY PHILLIP H. CONE*

A WAGE incentive system of the Dyer type, wherein the total number of minutes of every employee's time is accounted for, is a vehicle of tremendous possibilities in obtaining efficiency and in reducing costs in manufacturing plants. It can be likened to a good automobile providing transportation with advantages that cannot be obtained in any other way. But the mechanism of the automobile must be thoroughly understood and it must be intelligently handled. So it is with the incentive system. It will take a shop from one degree of efficiency to a higher degree in various intervals of time according to the understanding and ability used in operating it. It is not an automatic cure-all or self-energizing instrument, but a high-speed tool, which, to attain maximum results, requires the proper amount of power and feed behind it. Indeed, during and after installation, the management alone can furnish this power and feed.

How to Overcome the Resistance of Workmen

When a wage incentive system is installed in a plant, the management must remember that any new method is resisted throughout a shop until it has been proved beneficial, and when it affects the pay check of the men the resistance is greatly increased. With this fact in mind, the management must first sell the supervisory organization, namely the superintendent and foremen, because their full cooperation is vital if the best results are to be obtained. Incidentally, the management can go much further than anyone else in selling the incentive plan and moreover, it is not reasonable to expect the incentive engineer to carry the burden of selling the plan singlehanded to everyone in the plant in addition to setting up its application.

When the wage incentive plan is being installed in a department, the management, by spending from one-half to one hour a day on the problem, can inform itself as to how the setup is beng made. By so doing it is in a position, when the plan is put into operation, wherein it is convinced of the fairness of the setup and therefore can intelligently stand behind it.

Success of Plan May Require Changes in Processes

Various problems come up while the time study is being made. The duties of the workers, for example, may have to be rearranged in order that each man has a sufficient amount of work to permit him to produce standard performance, or again some manufacturing process may be changed to advantage. In such cases the daily contact of management results in the changes being accomplished expeditiously. The management must drive home to the employees the fact that the incentive department is and always will be fair and impartial toward both the company and the men in the ranks. Furthermore, it is necessary to see that the incentive department always maintains this characteristic as one of the vital elements of its work and that as time goes on its fairness and precision merit additional confidence and trust.

When the time studies were completed and checked at our plant, we called together the workmen of the department in which the plan was to be applied the following day and explained to them its function, assuring them of its fairness and asking their cooperation. Incidentally, from the first day the plan becomes effective the immediate problem is to get the department efficiency to the point where the men earn a premium. To accomplish this is needed at various times leadership, some joshing, perhaps some driving and, above all, confident assurance. But these elements cannot best be used unless there is intelligent understanding on the part of the management. However, when the men once get a taste of extra earnings, the department is "over the top" and the management can count on their sincere cooperation.

Program Stresses Common Interests of Management and Men

Application of the program just described results in certain definite benefits. The management gets a new and detailed picture of what is going on in the plant. Furthermore, the combined effort of the management and of the shop organization in setting the plan into action gives each a better appreciation of the common good of the plant. Too often the shop doesn't appreciate the viewpoint of the management and the management in turn does not appreciate the troubles of the men on the firing line. Moreover, during the process of making time studies the qualities of workmanship must be thoroughly considered in order that the amount of work necessary for a job may be determined. The qualities of workmanship too often vary to the detriment of the product, and the establishment of a standard in such a situation is of great value. In addition, the management sets an example by intelligently understanding the work and as a result the whole organization keeps step and is prepared to go on with the job after the installation has been made.

In the Dyer system the common denominator, or "unit," is the amount of work that an average man working at an average rate of speed will do in one minute. The workman is paid a premium for all units produced over and above standard performance, which is 60 units for every 60 min. of work. The premium is computed by calculating the total units produced during the day against the total minutes of time the workman spends in the department. Credit is allowed the workman for loss of time not under his control. The foreman is paid a premium based on the efficiency of the men in his department, modified by the loss of time occurring therein and by excessive expense over and above a standard that is set up on this item.

All of Workman's Time Accounted For

Production is tabulated by checkers spending full time in the department to which they are assigned. They also tabulate all delays and waste time. If a checker is encouraged to observe and learn operating methods, he becomes

*Assistant manager foundry division, Cincinnati Milling Machine Co., Cincinnati. Abstract of paper presented at meeting of Cincinnati Chapter of National Association of Cost Accountants.

not only a valuable assistant to the foreman by advising him immediately of conditions which should be corrected, but also the future foreman in training.

The control sheet is a cumulative weekly record for each department showing the total units produced. It accounts for every minute expended by every man in the department during the week and expresses the cost of time in terms of productive labor, non-productive labor and waste labor per 1000 units produced. It also shows the average efficiency of the workmen. At the top of the control sheet in a line known as the "reference period" is the efficiency of the department before the application of the system. Study of the sheet each week gives a picture of the current results accomplished and the comparison of the weekly record with the reference period tells how much money is being saved.

Study of Records Leads Way to Increased Efficiency

On a separate form just under the control sheet is the work sheet, which amplifies the data on the control sheet. Study of it reveals the reason why a large amount of work must be done in the future to arrive at a still higher rate of efficiency. Some of the factors retarding the development of further savings may be lack of sufficient equipment, absence of a maintenance system which would obviate the necessity of men standing idle while equipment is repaired, use of a productive workman's time to get material or to do some other non-producing task and the tardiness of departments in delivering materials to the main assembly departments.

Through the establishment of a wage incentive system, provided that the management creates and leads in a desire for progress, it is possible to transform an organization hitherto working in a habitual routine into a thinking organization. To place a definite value on the change-over is hardly possible, but its worth can be appreciated. Briefly, the principal beneficial effects can be summarized as follows:

1. Management becomes familiar with important details generally overlooked.
2. The viewpoints of the management and of the shop organization are blended for the common good and better cooperation results.
3. The workmen earn increased wages.
4. Foremen or supervisors earn larger salaries.
5. The training which the checker gets makes him the potential foreman for future needs.
6. A fixed standard of workmanship is established, resulting in a more uniform product.
7. A guide and control for efficiency becomes the tool of the whole organization.
8. Waste becomes the common foe of all.
9. The true value of time is appreciated.
10. An organization heretofore leveled off by routine becomes a thinking organization.
11. New production methods are developed.
12. Constant progress is made toward higher efficiency.
13. The company earns greater profits.

Safety Not Entirely a Mechanical Matter

Human Element Looms Large and May Defeat Best Outfit of Safety Devices Ever Installed

BY JOHN H. WATSON, JR.*

IT is not an easy task to obtain satisfactory results in industrial accident prevention. A large proportion of employees, as well as of other individuals, are naturally habitually careless. Because injury is not sure to result from carelessness, they almost entirely discount the possibility of injury resulting therefrom. They often avoid the use of safety devices furnished them for their own protection, if to use them means a little extra work or trouble. Many of them are even inclined to resent the attempts of the employer to make them utilize safety methods for their own protection.

Even if the safety men be never so hard working, never so zealous, in their crusade for safety, they cannot obtain the desired results without the organized cooperation of the plant superintendents, the foremen and sub-foremen, and the big bulk of the workmen. It is a real problem, how to obtain such cooperation. The safety men must have and use rare tact and good sense in their dealings with the plant managers and men; and right here is where the officers of the company should do their part toward the accomplishment of the safety program. They should support their safety men in all reasonable demands which tend to secure safety, and they should let the whole plant organization know that they stand squarely behind the safety men in such reasonable demands.

Large Drop in Lost-Time Cases

Our industrial accidents have shown a steady decrease since we embarked on a safety crusade. Our lost-time accidents in 1924 amounted to 430; in 1925, to 345; in 1926, to 174; in 1927, to 46; in the first 10 months of 1928, to 20, although during most of the 10 months we have been operating nearly to capacity. Our blast furnaces have a record of operating 449 days in a stretch without a single lost-time accident. Our open-hearth department has a record of operating 401 days in a stretch without a single lost-time accident. Once in a while, but not often, our entire plant will operate for a month without a single lost-time accident. It did so in October of this year, and there had been no lost-time accident in November up to Nov. 15, making a period of at least 45 days without a single lost-time accident in the entire plant.

Our safety organization, which has been worked out by Dr. R. C. Engel and which I believe to be efficient, is as follows:

The active safety organization consists of a safety inspector from each plant department, appointed from the assistant superintendents and general foremen, and numbering 14 in all, with Dr. Engel at their head. This group meets weekly. At these meetings reports of accidents are presented, investigation is made of the circumstances attending them, and ways and means of preventing similar accidents in the future are discussed. New ideas with reference to safety equipment and safety methods are presented to and discussed at these meetings. Heating, ventilating, lighting and sanitation problems pertaining to the plant are brought before the meetings. In these discussions every safety inspector takes an active part.

General Committee Examines Devices

A general safety committee, consisting of the superintendent of the blast furnaces, the superintendent of the

*President Corrigan, McKinney Steel Co., Cleveland. This is abstract of a paper read before the All-Ohio Safety Congress.

coke plant, one of the superintendents representing the steel plant and the company's chief engineer, together with Dr. Engel, who acts as chairman, meets once a month. All questions relating to safety devices are brought before this committee for thorough investigation and decision. It is a rule that all safety matters brought before this committee must have an expression of opinion from the proper department superintendent, before any action is taken. The general safety committee recommendations with regard to safety devices are forwarded to the management for the necessary authorization. Through the foregoing procedure, every department superintendent in the plant is made thoroughly conversant with all safety suggestions pertaining to his department and with the cost attendant upon the installation of safety devices.

Safety meetings are held in each department of the plant at least once a month. These meetings are attended by all assistant superintendents and foremen and are presided over by the superintendent of the department.

Functions of the Service Department

Dr. Engel's department, called the service department, sends a weekly safety report to the plant superintendents, safety inspectors and foremen, showing the safety standing of all departments in the plant, thus creating a friendly competition between departments. The service department investigates near lost-time accidents, and studies ways and means of preventing similar accidents. It issues to each superintendent and safety inspector a daily report of all accidents which have occurred in their departments, and brings to the attention of the superintendent reports of safety violations or unsafe practices in his department.

Through the safety inspectors, the service department makes a general safety inspection of the entire plant. Through its employment bureau, it instructs all new employees as to safety methods and safe practices, and uses a follow-up system through personal contact, until the new employee becomes thoroughly familiar with his job.

Through the safety organization which I have outlined, and the active co-operation of the whole plant organization, we have been able to obtain progressively favorable results, as I have already indicated. We hope to make further progress. We may attain practically 100 per cent of perfection in the matter of safety devices, but human frailty does not permit a 100 per cent control of the human element. We believe that we have not yet reduced our accidents to the irreducible minimum, and we hope next year to better this year's record.

Productivity and Markets Intimately Related

Mass Production Economical Only When An Unhampered Market Is Available—Finding Such Markets the Task for Managers

At a meeting of the British Association for the Advancement of Science, held recently in Glasgow, Scotland, Prof. Allyn A. Young presented an address on "Increasing Returns and Economic Progress." As Professor Young, the president of the section on economic science and statistics, is an American (formerly on the Harvard faculty but now teaching at London University), his comparisons of business conditions as they exist in America and in England were widely quoted. In his opinion the growth of markets has been one of the prime factors in industrial progress for more than a century, and its influence is no less clear in years since the war when "mass production" and "rationalization" have been the catch-words. Extracts from the address follow:

It appears to be generally agreed that Adam Smith, when he suggested that the division of labor leads to inventions because workmen engaged in specialized routine operations come to see better ways of accomplishing the same results, missed the main point. The important thing in the division of labor is that a group of complex processes is transformed into a succession of simpler processes, some of which lend themselves to the use of machinery. In the use of machinery and the adoption of indirect processes there is a further division of labor, the economies of which are again limited by the extent of the market. It would be wasteful to make a hammer to drive a single nail; it would be better to use whatever awkward implement lies conveniently at hand. It would be wasteful to furnish a factory with an elaborate equipment of specially constructed jigs, gages, lathes, drills, presses and conveyors to build a hundred automobiles; it would be better to rely mostly upon tools and machines of standard types, so as to make a relatively larger use of directly applied and a relatively smaller use of indirectly applied labor. Mr. Ford's methods would be absurdly uneconomical if his output were very small and would be unprofitable even if his output were what many other manufacturers of automobiles would call large.

Then, of course, there are economies of what might be called a secondary order. How far it pays to go in equipping factories with special appliances for making hammers or for constructing specialized machinery for use in making different parts of automobiles depends again upon how many nails are to be driven and how many automobiles can be sold. If the benefits and the costs of using such appliances are spread over a relatively large volume of final products, their technical effectiveness is a larger factor in determining whether it is profitable to use them than any difference which producing them on a large or a small scale would commonly make in their costs. In other instances the demand for productive appliances is more elastic, and beyond a certain level of costs, demand may fail completely. In such circumstances secondary economies may become highly important.

Doubtless, much of what I have said has been familiar and even elementary. I shall venture, nevertheless, to put further stress upon two points. The first point is that the principal economies which manifest themselves in increasing returns are the economies of capitalistic or roundabout methods of production.

Mass Production May Easily Become Wasteful

THE second point is that the economies of roundabout methods, even more than the economies of other forms of the division of labor, depend upon the extent of the market—and that, of course, is why we discuss them under the head of increasing returns. It would hardly be necessary to stress this point, if it were not that the economies of large-scale operations and of "mass production" are often referred to as though they could be had for the taking, by means of a "rational" reorganization of industry. Now I grant that at any given time routine and inertia play a very large part in the organization and conduct of industrial operations. Real leadership is no more common in industrial than in other pursuits. New catch-words or slogans like "mass production" and "rationalization" may operate as stimuli; they may rouse men from routine and lead them to scrutinize again the organization and processes of industry and to try to discover particular ways in which they can be bettered. For example, no one can doubt that there are genuine economies to be achieved in the way of "simplification and standardization," or that the securing of these economies requires that certain deeply rooted competitive

wastes be extirpated. This last requires a definite concerted effort—precisely the kind of thing which ordinary competitive motives are often powerless to effect, but which might come more easily as the response to the dissemination of a new idea.

There is a danger, however, that we shall expect too much from these "rational" industrial reforms. Pressed beyond a certain point they become the reverse of rational. I have naturally been interested in British opinions respecting the reasons for the relatively high productivity (per laborer or per hour of labor) of representative American industries. Those who hold that American industry is managed better, that its leaders study its problems more intelligently and plan more courageously and more wisely, can cite no facts in support of their opinion save the differences in the results achieved. Allowing for the circumstance that British industry, as a whole, has proved to be rather badly adjusted to the new post-war economic situation, I know of no facts which prove or even indicate that British industry, seen against the background of its own problems and its own possibilities, is less efficiently organized or less ably directed than American industry or the industry of any other country.

Power-Driven Machinery Requires Scarce Labor

SOMETIMES the fact that the average American laborer works with the help of a larger supply of power-driven, labor-saving machinery than the laborer of other countries is cited as evidence of the superior intelligence of the average American employer. But this will not do, for, as every economist knows, the greater the degree in which labor is productive or scarce—the words have the same meaning—the greater is the relative economy of using it in such indirect or roundabout ways as are technically advantageous, even though such procedure calls for larger advances of capital than simpler methods do.

It is encouraging to find that a fairly large number of commentators upon the volume of the American industrial product and the scale of American industrial organization have come to surmise that the extent of the American domestic market, unimpeded by tariff barriers at the State boundaries, may have something to do with the matter. This opinion seems even to be forced upon thoughtful observers by the general character of the facts, whether or no the observers think in terms of the economists' conception of increasing returns. In certain industries, although by no means in all, productive methods are economical and profitable in America which would not be profitable elsewhere. The importance of coal and iron and other natural resources needs no comment. Taking a country's economic endowment as given, however, the most important single factor in determining the effectiveness of its industry appears to be the size of the market. But just what constitutes a large market? Not area or population alone, but buying power, the capacity to absorb a large annual output of goods. This trite observation, however, at once suggests another equally trite, namely, that capacity to buy depends upon capacity to produce. In an inclusive view, considering the market not as an outlet for the products of a particular industry, and therefore external to that industry, but as the outlet for goods in general, the size of the market is determined and defined by the volume of production. If this statement needs any qualification, it is that the conception of a market in this inclusive sense—an aggregate of productive activities tied together by trade—carries with it the notion that there must be some sort of balance, that different productive activities must be proportioned one to another.

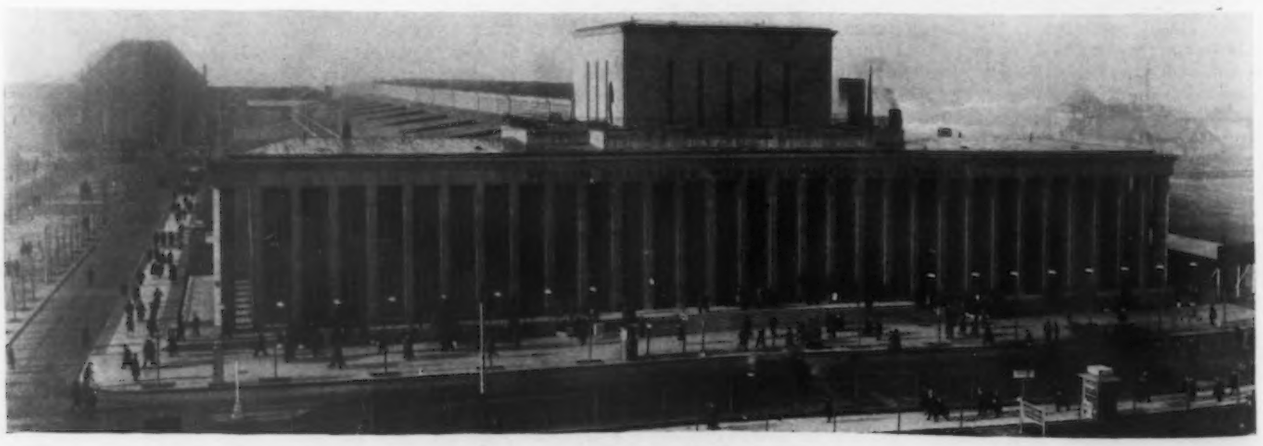
Expanding Markets Important for Centuries

IT is dangerous to assign to any single factor the leading role in that continuing economic revolution which has taken the modern world so far away from the world of a few hundred years ago. But is there any other factor which has a better claim to that role than the persisting search for markets? No other hypothesis so well unites economic history and economic theory. The industrial revolution of the eighteenth century has come to be generally regarded, not as a cataclysm brought about by certain inspired improvements in industrial technique, but as a series of changes related in an orderly way to prior changes in industrial organization and to the enlargement of markets. It is sometimes said, however, that while in the Middle Ages and in the early modern period industry was the servant of commerce, since the rise of "industrial capitalism" the relation has been reversed, commerce being now merely an agent of industry. If this means that the finding of markets is one of the tasks of modern industry it is true. If it means that industry imposes its will upon the market, that whereas formerly the things which were produced were the things which could be sold, now the things which have to be sold are the things that are produced, it is not true.

The great change, I imagine, is in the new importance which the potential market has in the planning and management of large industries. The search for markets is not a matter of disposing of a *surplus* product, but of finding an outlet for a *potential* product. Nor is it wholly a matter of multiplying profits by multiplying sales; it is partly a matter of augmenting profits by reducing costs.

Although the initial displacement may be considerable and the repercussions upon particular industrials unfavorable, the enlarging of the market for any one commodity, produced under conditions of increasing returns, generally has the net effect of enlarging the market for other commodities.

EXHIBITION HALL of the German Machine Tool Builders' Association at the Leipzig Trade Fair, Which Is to Be Held at Leipzig, Germany, March 3 to 13, 1929. This building has about 225,000 sq. ft. of floor space and is served by railroad spurs and three large overhead cranes. Machines of a wide variety of sizes and capacities will be shown, most of them under power. The display of machinery, iron and steel and building materials at the fair will include some 2000 exhibits. Twenty-four countries, including the United States, will show products. American offices of the Leipzig Trade Fair are at 11 West Forty-second Street, New York

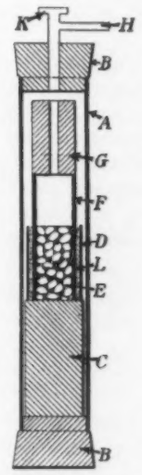


Pure Manganese Makes Interesting Alloys

British and Americans Prepare 99.99 Per Cent Metal—Carbon-Free Alloys Much Tougher Than the Corresponding Low-Carbon Manganese Steels

IN a research into the alloys of iron and manganese under way at the Bureau of Metallurgical Research, Carnegie Institute of Technology, Pittsburgh, manganese metal and iron-manganese alloys of unusual purity have been prepared. Manganese steels are, of course, well known, but in commercial castings the higher the manganese the higher is the carbon. To ascertain whether other valuable alloys existed in the range between 1 and 20 per cent it was necessary to provide some manganese metal of unusual purity.

Commercial metal, produced by electric furnace processes or by silicon reduction, has been available in three grades at least since 1919, ranging from 92 to 97 per cent manganese. Silicon and carbon in these materials are less than 1 per cent and 0.25 per cent respectively, and iron makes up the difference. Manganese produced commercially by aluminum reduction has less than 0.10 per cent carbon, but the manganese analyzes only 96 to 98, the balance being mostly iron and silicon in equal parts. Evidently a much purer metal is desirable for scientific investigation. It is possible to make manganese 99.3 per cent pure by alumino-thermic reduction of Mn_3O_4 in an alumina crucible, but since the aluminum powder used for reduction always contains silicon and iron, these metals enter the final product, together with a variable amount of aluminum (which must be used in slight excess).



Retort for Distilling Manganese

A, Silica tube.
B, B, Rubber stoppers cemented in.
C, G, Magnesia blocks.
D, Porcelain sleeve.
E, Magnesia pot containing crude manganese.
F, Inverted magnesia pot for condensate.
H, Connection for vacuum pump.
K, Observation window.
L, Fine alumina packing.

Consequently Drs. F. M. Walters, Jr., V. N. Krivobok and J. B. Friauf, the Pittsburgh investigators, turned to the vacuum distillation method described by Marie L. V. Gayler before the (British) Iron and Steel Institute on May 5, 1927. The retort is shown in the sketch. It is placed within the coil of a high-frequency induction furnace, exhausted by a vacuum pump to less than 1 mm. pressure, and alternating currents sent through the coil until the electrical currents induced in the crude manganese have heated it slightly above the melting point. The manganese vapor arising slowly from the melt is condensed in the cooler prolongation of the crucible, and the process continued until about half the charge had been so distilled. The first metal to sublime is the purest, samples analyzing *nil* for silicon, aluminum, iron and phosphorus, a trace of sulphur, and 0.003 to 0.012 of nitrogen. Typical analyses of samples secured in this manner by Miss Gayler are as follows:

Silicon	0.002 to 0.044	per cent
Aluminum	Trace to 0.035	
Iron	0.003 to 0.067	
Sulphur	Trace to 0.032	
Phosphorus ...	Under 0.001 to 0.005	
Nitrogen	0.003 to 0.012	
Manganese	99.991 to 99.8	(by difference)

The Pittsburgh scientists report that a single distillation of the 94 per cent commercial grade gave a product with 0.009 per cent carbon and traces of iron, aluminum and silicon. A photograph of a sample of this metal is reproduced.

Miss Gayler finds that the 99.99 per cent manganese melts at 1244 deg. C. (accurate to within 3 degrees, plus or minus). She also finds four thermal changes, representing transformations in the solid, as follows:

SAMPLE of Manganese Distilled at Carnegie Institute of Technology

On Heating	On Cooling
1,188 deg. C.	1,195 deg. C.
1,043	1,005
744	740
740	681

It is silvery gray; brittle and hard enough to scratch glass and does not tarnish readily in air. The lower transformation points are probably associated with some change in crystal structure; at any rate a cooling ingot of manganese develops numerous cracks and fissures at about 700 deg C. The presence of impurities has marked effect on this shrinkage. Manganese melted under nitrogen also absorbs as much as 2.1 per cent of the gas, which forms a bluish gray micro-constituent.

Pure manganese prepared at Pittsburgh has been used in the manufacture of iron-manganese alloys, melted in vacuum, and ranging up to 19 per cent manganese and 0.06

per cent carbon. A preliminary statement regarding the properties of these alloys was made at the open meeting of the Metallurgical Advisory Board, Oct. 19. The alloys are remarkably tough when manganese is over 6 per cent. Hardness also increases with the manganese up to at least 10 per cent, and is practically independent of heat treatment. Certain interesting abnormalities in the transformation and recrystallization temperatures have also been noted. Little carbon penetrates the highest manganese alloys during case hardening. Twenty per cent manganese irons are also much softer than the 10 per cent alloys. Drs. Walters, Krivobok and Friauf find the hardness of their alloys agrees generally with that found some time ago for corresponding low-carbon manganese steels by Sir Robert Hadfield; however, Hadfield's steels were reported to be brittle.

A New Measure of Industrial Efficiency

Production Gaged Per 1000 Factory Man-Hours Worked—Wide Variations Shown, With High Rating for Smaller Plants

A NEW measure of industrial efficiency—1000 man-hours—was described in a joint paper by L. P. Alford, vice-president Ronald Press Co., New York, and J. E. Hannum, mechanical engineer, presented at the annual meeting of the American Society of Mechanical Engineers at New York, Dec. 5. This mensural unit, called the "kilo man-hour" for convenience, shows a surprising variation in output for the same amount of labor. A survey of 100 industries showed a range in the value of product per 1000 factory man-hours from $10,870 down to $548—a ratio of 19 to 1.

Wide variations were also found among companies in the same industries. For example, in terms of physical production the ratio of maximum to minimum output per kilo man-hour in the manufactured gas industry was 40 to 1. In gray iron castings it was 16 to 1; in iron and steel tubing, 7 to 1; in steel fabrication, which showed the narrowest spread, 1.54 to 1.

A surprising disclosure is that smaller companies, in many instances, show higher physical production per kilo man-hour than larger organizations in the same industry. This high production per hour, says the paper, may be a reason for the persistence of the small plant in spite of consolidations and mergers. It was found that the smallest company has a higher rate of production than the largest company in 35 industries. The reverse was found true in 18 industries.

From the kilo man-hour, the paper states, numerous factors of industrial operation can be developed, among which are the following:

Factor	How Expressed
Productivity	Physical volume of product per kilo man-hour
Labor permanence	Number of workers employed per kilo man-hour
Fixed capital investment:	
Buildings	Investment in dollars per kilo man-hour, or Square feet of floor area per kilo man-hour
Machinery	Investment in dollars per kilo man-hour
Primary power	Horsepower utilized per kilo man-hour
Industrial accidents:	
Frequency	Number of lost-time accidents per kilo man-hour
Severity	Number of working hours lost per 1000 kilo man-hours
Costs:	
Wages	Dollars per kilo man-hour
Material cost	Dollars per kilo man-hour
Prime cost	Dollars per kilo man-hour
Overhead charges	Dollars per kilo man-hour
Manufacturing cost	Dollars per kilo man-hour
Profit:	
Manufacturing	Dollars per kilo man-hour
Net	Dollars per kilo man-hour
Selling price	Dollars per kilo man-hour

The paper was confined to a substantiation of the method and 85 tables, covering different groups of industries analyzed by the new method. The findings of the authors were submitted as a basis for further development. In conclusion they recommend that man-hours of labor be reported in the United States census, so that their method of measuring the efficiency of industries may be generally used.

In discussing the paper Laurence H. Sloan, managing editor Standard Statistics Co., Inc., New York, said that reporting corporate results—volumes, values, profits, etc.—in terms of kilo man-hours would revolutionize the aspect of business that has to do with appraising financial risk. Bankers, careful investors and conscientious security analysts would go beyond mere welcome of such data; it is a safe assumption, he stated, that they would do anything within reason to obtain them.

Physical Volume of Production per 1000 Factory Man-Hours

Industries	Number of Companies	Number of Employees	Number of Factory Man-Hours Worked	Production Rate per 1000 Factory Man-Hours
Iron and steel industry	36	48,889	138,712,045	37.5 gross tons
Fabrication of steel	6	3,004	8,065,790	45.15 gross tons
Skelp, plates and sheets	8	8,634	23,637,192	56.5 gross tons
Structural shapes	6	3,388	9,654,736	32.8 gross tons
Tubing	5	8,062	21,668,941	46.2 gross tons
Machine-building and metal-working industries	224	172,308	414,439,963	10.6 tons
Agricultural implements	5	2,677	6,650,821	16.65 tons
Automobiles	12	151,447	382,211,176	9.08 cars
Automobile parts	5	1,367	3,630,696	12.85 tons
Boilers and tanks	10	4,064	10,079,771	12.05 tons
Bolts, nuts, and rivets	6	4,419	10,895,000	16.60 tons
Brass, bronze, and copper	14	23,510	61,658,572	8.15 tons
Cast-iron enameled ware	5	8,664	20,423,347	8.08 tons
Electric machinery apparatus and supplies	8	14,777	36,053,558	6.03 tons
Engines, turbines, and pumps	5	2,471	6,162,638	3.17 tons
Forgings	11	5,260	12,936,999	16.64 tons
Gray-iron castings	16	9,409	19,167,215	14.05 tons
Hardware	15	8,164	20,008,959	14.20 tons
Hoisting and conveying machinery	5	2,643	6,491,829	7.46 tons
Machine tools	8	2,276	5,308,719	2.70 tons
Malleable-iron castings	11	4,107	9,563,424	6.92 tons
Non-ferrous castings	12	4,170	10,037,141	6.41 tons
Oil-well equipment	5	2,035	5,177,482	7.80 tons
Railroad accessories	13	15,679	36,205,412	15.50 tons
Sheet-metal products	10	8,261	20,566,387	17.30 tons
Special machinery	8	3,098	4,801,704	5.15 tons
Springs	7	1,684	4,393,941	13.50 tons
Steel castings	15	8,485	21,803,482	14.95 tons
Valves and fittings	13	10,215	21,260,800	7.00 tons
Wire products	10	12,143	30,904,117	8.71 tons

Blast Furnace Metal for Castings

Can the Blast Furnace Compete with the Pipe Foundry?—Analysis of Conditions and Costs Involved

BY DAVID BAKER*

IN THE IRON AGE of July 22, 1920, is an interesting account of the first successful attempt at iron making in this country, in Massachusetts. From it we learn that the first casting made in America was an iron pot weighing 2 lb. 13 oz., its capacity being given as one quart less one gill. The inside measurements were 4.5 in. wide by 4.5 in. deep. Under date of March 15, 1647, Robert Child, who was connected with the works, wrote to John Winthrop, Jr., then in Connecticut: "We have cast this winter some tuns of pots, likewise mortors, stoves and skellets."

On Aug. 4, 1648, Governor Winthrop wrote his son that "the iron works goeth on with hope and now yields about seven tuns per week." All these castings were from metal direct from the blast furnace.

I presume there is not a blast furnace manager in this country who has not made it a practice to produce at the furnace a certain number of castings required about the plant for replacements. The usual practice is either to divert from the main runner the metal required to fill the molds or to arrange for filling a small ladle at casting time, which is poured into the flasks by means of a small electric or hand crane. In such cases care is taken to choose the right kind of iron at the time when it is flowing in sufficient volume. The writer remembers seeing in 1886 a whole set of furnace columns and mantel cast at the Paxton Furnaces, near Harrisburg. These were cast in the pig bed for use in the reconstruction of one of the furnaces.

Emergency Practice Becoming Regular

Furnace-made castings have been resorted to from time immemorial in case of emergencies at the blast furnace, developing into a regular practice at most plants for certain castings, on account of the saving in time and cost. The question naturally arises: What economy may be secured by casting direct from the blast furnace as compared with casting the pig in a machine and selling it to the foundry, with the usual rehandling and remelting?

If we assume it possible to dispose of the entire output of a blast furnace to a foundry conveniently located, delivering the product in ladles, the furnace would still require the pig machine to handle Sunday iron and off casts. Hence there would be no saving in the investment; but, as the machine would not need manning all the time, there would be some saving in operating labor and a marked reduction in the cost of upkeep.

In considering this subject let us take a merchant furnace of 250 to 300 tons daily output, for stacks of this capacity are having hard sledding under present conditions. In addition, it is easier to find foundries whose daily melt is up to that figure.

Two Shifts a Day in Foundry

As to the amount of metal which could be absorbed regularly by a foundry under the assumed conditions, let us stipulate that the foundry change its practice of operating with one crew on day shift, and operate with two 10-hr. shifts. If the objection is made that that is impracticable, we need only refer to English practice, where one may see large foundries operated in this way; for instance, Stanton Iron Works Co., Ltd., which manufactures de Lavaud and sand-cast pipe.

The next phase of the problem, assuming that metal direct from the blast furnace may be made suitable for the production of gray iron castings of standard strength and soundness, is—what percentage of such iron could the furnace under discussion be expected to produce? In other words, can a furnace be kept on grade? Good average practice on basic iron in a month's run from such a stack may be put at 95 per cent and I am sure many furnacemen can show that for a year's run.

Foundry Equipment Savings

Let us now look at the molten iron from the standpoint of foundry costs. If 100 per cent of the hot metal for this shop may be secured direct from the blast furnace, the saving to the foundry would be the cost of remelting in the cupola and the cost of unloading and rehandling the pig in the foundry yard. To this should be added a lower overhead due to reduced investment in cupolas and the larger item, reduced outlay for the foundry equipment, as the plant would be operated night-and-day shifts against the present standard single-shift practice that obtains in this country. This would have an important bearing on the cost of operation, other things being equal. It is apparent in rolling mill costs, when, owing to reduced orders, it is necessary to operate single shifts instead of double.

The saving in the investment can be visualized if one considers the reverse condition, the increase of equipment required to enable a plant to produce, on day shifts only, what is usual with night-and-day operation. We are so accustomed to foundries operating on day shifts only that probably the possible economies obtainable by double-shift operation have not been considered by those with capital in the industry.

In case of double-shift operation, the cupolas are in blast continuously until necessary to blow down for repairs, just as was done in Bessemer steel practice, when all the iron was delivered in pig form from the blast furnace. This means a saving in fuel, refractory material and labor.

Unit Costs Tied Up with Quantity

The cost of melting pig in the cupola depends largely on the tonnage melted per day. In a foundry melting a large tonnage the costs may be as low as $4 a gross ton, including handling and all overhead, while even a large shop may find these figures read $10 a ton when not running full. A managing director of a large English foundry placed this average figure at $4.85 a gross ton for his shop. In this discussion I think a fair figure would be $5 a gross ton of pig charged.

If now we assume that the foundry is arranged for operation in double shifts on metal direct from the blast furnace, and that 95 per cent of that iron is suitable, we

*Consulting engineer, 1011 Chestnut Street, Philadelphia.

probably would find it advisable to give the employees of the foundry Saturday night, Sunday and Sunday night off. That means operating 11 shifts a week. From a blast furnace production of 2100 tons a week, as in the case we are considering, we would find the following disposition of furnace production: 95 per cent of 2100 = 1995 tons, of which the foundry would use as direct metal 11/14 or 1567 tons, leaving 533 tons of iron—some of it a little too high or too low in silicon—which could be sold as basic iron.

The small percentage of high-sulphur pig made would best be remelted in the blast furnace, along with the gates and sprues from the foundry. This would involve no expenditure of fuel if the foundry made the usual yield of marketable product, the excess heat of the furnace hearth taking care of this tonnage without difficulty.

Never Undertaken Commercially

Use of direct blast furnace metal for the production of castings is not a new proposal, but why has it never been undertaken on a commercial basis? In other words, why has not some furnace company started a pipe foundry and operated the shop with direct metal? I mention a pipe foundry because that industry is a large consumer of pig iron and the business is usually obtained in fairly large orders. If a canvass is made of blast furnace managers, probably a small percentage would say such a scheme is practicable; while among foundry managers it would be difficult to find any to approve.

This has been the writer's experience in this country, but in England we found that the process was considered more feasible.

The difficulty in the minds of the foundrymen is the almost universal belief that the cupola purifies the iron by remelting it. There is also a decided opinion that a mixture of several kinds of iron is necessary, to produce satisfactory pipe. The purifying effect claimed for the cupola is a very doubtful one.

Advantage from Mixing Irons

There is a mixing possible in remelting iron, not in the cupola itself but as the iron is tapped into the ladle, which is more effective when a forehearth is provided with the cupola. It is a commercial advantage to be able to utilize several kinds of pig iron and scrap in the foundry production. But it must not be forgotten that in this remelting in the cupola a large percentage of the sulphur in the coke goes into the molten bath, and sulphur is a hardener and tends to produce blowholes in the castings.

As an illustration of the kind of iron found satisfactory in certain cast pipe, the following analysis taken from a report by the Underwriters' Laboratories is interesting. "The results of 35 analyses selected at random from the records of a large foundry over a period of seven months were as follows:

	Silicon Per Cent	Sulphur, Per Cent
Average	2.53	0.077
Maximum	2.73	0.114
Minimum	2.35	0.060

In this case the iron went into the production of de Lavaud pipe, and iron with silicon as shown was chosen to prevent the metal chilling white when cast against the metallic mold. Had direct blast furnace metal been used, iron much lower in silicon would have served as well, provided the sulphur had been kept down to the usual blast furnace practice—0.03 per cent and under.

This iron with the lower silicon would have cost much less to make. Suppose, for example, the average silicon of 1 per cent in the direct metal were found satisfactory with the lower sulphur in place of 2.53 per cent used. To get the 1.50 per cent additional silicon would require an expenditure of from 250 to 300 lb. of coke per ton of pig in Eastern merchant furnace practice, which may mean at some plants an additional cost of $1 per ton of product. If we take into consideration the loss of output owing to the lighter burden carried on the furnace, a spread of $4 and even more per ton may be incurred at some furnaces, to secure the higher silicon.

Qualities Required by Foundries

The claim is made in a patent issued to David F. Baker, April 21, 1925, No. 1,534,561, that the low-silicon low-sulphur iron direct from the blast furnace has the qualities sought for in foundry practice, when a much higher silicon cold pig is now specified for that purpose; but the effect of the silicon is nullified to a marked degree by the large increase in the sulphur content during melting in the cupola. The claim is made that the reason all efforts so far to put the full output of a blast furnace into castings for the market other than ingot molds has been a failure is due both to the foundryman and the furnace manager making the error of using iron for the purpose made in too hot a furnace; that is, with a too high silicon content.

This iron is too "rich" as it comes from the blast furnace; it has too much "kish" and graphitic carbon, and the castings produced are unsound and also too soft. It seems unreasonable to some that metal direct from the blast furnace should make sound castings where the sections are thin.

They claim that, because the iron is reduced from the ore in one process, it needs further treatment to produce satisfactory gray iron castings. Carrying this argument to the open-hearth steel process, one would expect steel made by the "pig and ore process" to be less satisfactory, say in wire manufacture, than steel made by the "pig and scrap process," but this is not borne out in practice.

Fluid Iron Can Be Made

I think every blast furnace manager has frequently made iron that was fluid enough for the successful production of stove plate castings. That iron, it is claimed, can be regularly produced up to 95 per cent of the total output.

If this is so, and we get back to the earliest furnace and foundry practice in this country, it would appear that a low-silicon, low-sulphur iron suitable for casting direct could be produced for at least $4 a ton less than iron run as specified for making de Lavaud pipe. If now we add to this figure the $5 shown as saved with the combination of furnace and foundry previously described, there is a total of $9 a ton to be picked up by a blast furnace going into pipe production, or by a blast furnace and iron foundry uniting and using blast furnace metal direct.

Here is an opportunity for the merchant furnace now idle, or operating at a loss, to eliminate the red figures in the ledger; that is, to reclaim an investment that is now on the way to be scrapped.

Heat Treating With Gas Gains

Approximately twice as much manufactured and natural gas is now consumed for industrial purposes as is sold for domestic uses. According to figures issued by Peoples Gas Light & Coke Co., Chicago, the metal trades are the largest industrial users and the consumption is increasing rapidly. That company in 1927 sold 1,800,000,000 cu. ft. to such plants as agricultural implement shops, non-ferrous foundries and railroad equipment manufacturers (to list only the three largest groups), while in 1928 the total was slightly over two billion, an increase of 11.5 per cent.

Steel treatment is a large consumer of gas everywhere. Larger amounts of money are apparently being invested in single pieces of gas-burning equipment by the metal trades than ever before. Several Chicago plants are reported to have purchased furnaces costing more than $20,000; the largest recently installed cost $65,000. This record of high investment in a year of guarded spending is evidence that important economies are anticipated. One battery of four gas-fired carbonizers is reported to have effected savings at the rate of $45,000 a year.

Research Is First Need in Marketing

Sales Activity Based on Adequate Marketing Data May Be Controlled as Accurately as Production

BY WILLARD E. FREELAND*

WE are in a period of great prosperity but there are many manufacturing enterprises which are not prosperous. Usually they have failed to keep in step with modern marketing, merchandising and advertising. Now they have a lot of lost ground to recover. There is no time for slow convalescence. The problem becomes one of financing extraordinary expense. The needed expenditure could not possibly be thrown into current costs without pricing the product out of the market. The cost must be amortized over a series of years. Some companies which need this treatment are financially sound and by foregoing dividends and cutting into surplus could finance the operation. Others, however, must borrow. The old fashioned banker would not think of lending money upon anything so intangible as a marketing scheme, but we are beginning to have a new type of banker who can see the wisdom of such an operation. Usually such a banker has a staff who can give able counsel and follow through the effort to the benefit of all concerned. Within the next 10 years marketing is going to demand the same banking support that production has long had.

Market Research Indispensable

Many marketing managers have problems because they will not interest themselves in the subject of commercial or marketing research. They are content to base policies and methods upon opinion, largely inbred opinion, rather than find the facts of their own business. Research is of such fundamental value to a business that the resistance to its introduction is almost incomprehensible to one familiar with its achievements. Its value to a small business is relatively as great as it is to a big business. Few businesses are so small that they cannot support at least one man on this work.

The sales forecast in these days of company budgets underlies the plans of every function of a business. The sales forecast has become a necessity for management planning and control of industry. A plea should be made for a larger development of statistical treatment of economic data as a measuring stick for whatever quota methods may be used, whether they be estimates by the sales force, analysis of past sales, or something else. It is just as important to study the business which you are not getting out of a territory as the business you are getting and the statistical measurement of economic data is invaluable for this purpose.

Another problem worth studying is the value of merchandising. This function intervenes between sales and production and serves as a real coordinator of their requirements. It is primarily concerned with the character of products, control of finished goods inventories, prices and similar matters which call for the service of men of special aptitudes and training. It is a particularly useful department of a business which has a long and varied line of products. A study of its usefulness is one of the most profitable things that a business manager can undertake for the work goes on steadily whether properly organized or not.

Marketing managers say much less about marketing or sales control than production managers about production control. They seem not to recognize that it is important to secure a control of marketing work. In many instances they have not had enough research to discover what they are or should be trying to control. Written marketing plans with quantity and time schedules and expense budgets are rarely found. It will be a big job to catch up with the 20 years' lead of production in this matter of control. There will continue to be a high turnover of sales managers until a type is established who believes in and practice research, planning and control in marketing.

What constitutes a proper sales territory? Shall territories be built upon business which ought to be had or upon business now had? Should a policy of intensive selling be used and territories cut down, or should selective selling be adopted and territories made larger? As it becomes better developed and understood, the statistical valuation will become the prime basis for establishing territories in place of past sales or physical load estimates of uncontrolled sales work.

A sound quota is needed as the basis for plans and budgets, for control standards, and possibly for a basis of compensation. Sales quotas are constantly set up which do not take into account the many forecasts of business conditions, or the estimated effect of planned sales campaigns, and which have no element of flexibility incorporated therein.

Routing of Salesmen

Routing of salesmen, frequency of calls upon customers and classification of accounts are related problems which demand attention. It appears that accounts and prospects must be classified if we are to determine the profitable frequency of all so that in turn men can properly be routed. Many do not believe in controlled routing of salesmen, but good research and cost accounting in marketing disclose conditions that almost demand it. There should be an element of flexibility in routing to meet emergencies, but not enough to break down central control.

Cost Accounting New in Field

Too many sales managers do not realize that cost accounting is one of the real problems in which progressive chief executives are vitally interested. Cost accounting in this field is hardly out of the primary stage. Where cost accounting in marketing has been attempted, the disclosures have often been quite disturbing, even though stimulative.

The actual costs of field work, advertising, sales promotion, etc., should be known. Sometimes rather good figures on these activities seem to be available, but do they provide a real basis for genuine control? Because they are historical, because they are usually total instead of element costs, and because they do not show the effect of various activities upon profits, they do not give a foundation for effective marketing control. The costs of selling varying items or classes of product should be known as an element of price setting. Cost accounting would provide a true picture of profits by salesmen to use as one of the bases of better compensation methods. Scien-

(*Concluded on page* 1523)

*Freeland & Warren, Boston; from a paper read before the Taylor Society in New York, Dec. 6.

Many Shop Uses for Chrome Plate

Mechanical Applications Requiring Hardness and Resistance to Abrasion Reviewed at Annual Meeting of Mechanical Engineers

IN a paper on the mechanical applications of chromium plating, presented at the annual meeting of the American Society of Mechanical Engineers, New York, Dec. 4, Dr. William Blum, chemist Bureau of Standards, Washington, pointed out that most applications depend either upon the resistance of the plating to tarnish, or upon its hardness and wear resistance. The paper was confined to the latter, in which uses, however, the protection against tarnish and corrosion furnished by the chromium is an added, though secondary, advantage. The value of chromium for any given application may depend not only upon its hardness, but upon other properties, such as tensile strength, ductility, thermal expansivity, density, melting point, electrical conductivity, adherence, and interfacial relations in contact with liquids or solids, data on which are included in the paper.

Chromium Plating Valuable on Measuring Devices

"Chromium plating has proved especially valuable on measuring devices," said Dr. Blum, "because its resistance to abrasion decreases the tendency for change in dimensions, or for any obliteration of graduation marks. The latter factor justifies its use on linear scales, verniers, micrometers, tapes, etc. It has been more extensively and more successfully applied upon plug gages than on any other measuring devices." Of numerous replies to a questionnaire, it was said that all were favorable except one, and the life of the plated gages in service was estimated to be from three to 10 times that of the unplated gages.

"Although it is possible with proper control of the plating process to deposit upon a gage exactly the requisite thickness of chromium, and to use the gage without subsequent lapping, experience has led in almost every case to the deposition of a somewhat thicker coating, the excess of which is then ground or lapped off. Data received include thicknesses from 0.0002 in. to 0.004 in. The thickest coatings were applied for bringing greatly undersized gages to dimension.

"In general the chromium coating should be thick enough so that it will not be penetrated when the gage is worn down to its lower wear limit. It is then a simple matter to strip off the chromium (by a reverse current in a sodium hydroxide solution) and to replate to the desired dimension. While of course the minimum thickness required will depend upon the dimensions of the gage before plating, there is no evident advantage in applying more than 0.001 in. of chromium, and for many purposes half that thickness is adequate.

"Chromium-plated thread gages are now used in several plants, but there is still much uncertainty and skepticism regarding their reliability," said Dr. Blum. "This doubt arises from the difficulty of depositing chromium uniformly upon the surface of the threads. In any plating process the deposit is always thinner in a depression than upon a projection, and this difference is accentuated by the notoriously poor 'throwing power' of the chromium-plating bath. As a result of the uneven distribution of chromium upon the threads, not only the diameter of the gage, but also the thread angle is altered.

"Experiments with thread gages, show that when any appreciable thickness of chromium is applied, the changes in pitch diameter and major diameter and in the included angle are likely to be greater than the normal tolerances for such dimensions. It will therefore usually be necessary to regrind the gages after plating, unless they have been previously so ground as to allow for the uneven distribution of the chromium. The latter procedure is probably feasible if a large number of similar gages are being made and plated.

"Data obtained regarding ring and snap gages indicate that chromium plating increases their life to about the same extent as it does on plug gages. It may safely be stated, therefore, that chromium plating will prove valuable upon any measuring device which is subject to abrasive wear in service, provided the shape is such that the chromium can be applied with reasonable uniformity."

Plated Dies for Forming Metals

Information received relative to drawing dies was said to show an apparent contradiction in that dies and mandrels used for tube drawing were generally reported as satisfactory, while wire-drawing dies were usually unsatisfactory. "The latter were reported as failing through flaking or peeling of the chromium, and subsequent scratching of the wires," said Dr. Blum. "The only obvious explanation of this discrepancy is that the apertures in the wire dies are usually much smaller and therefore more difficult to plate uniformly than those in the tube dies. In one plant a chromium-plated wire-stranding die has yielded over twice the normal service.

"In connection with the manufacture of hot-rolled seamless steel tubes, the successful use of chromium-plated drift balls was reported. This application no doubt rests partly upon the resistance of the chromium to oxidation at the elevated temperatures employed, as well as upon its resistance to abrasion.

"Very favorable reports were received regarding the value of chromium plating upon dies used for forming sheet steel and brass. In some cases the life of the dies is increased up to eight times the normal service. One special advantage observed with the chromium-plated surface is that the metal does not stick to it as much as to steel. It is significant that the thickness of the chromium coating on these dies is usually less than 0.0005 in."

In those cases where the metal is formed, or a design produced upon it, as in stamping dies, by a sudden impact instead of by a steadily applied pressure, the chromium coating was said to be of doubtful value. "This is because under such severe conditions the chromium tends to flake or chip, probably because the underlying metal, even when it is case-hardened, is at least temporarily deformed," said Dr. Blum. "In such cases success is more probable with thin than with thick coatings. A few experiments, not completed, upon coinage dies at the United States Mint in Philadelphia, illustrate this difference. Those dies with a coating of 0.0005 in. or more of chromium all failed in a comparatively short time. Those with only

0.0002 in. of chromium lasted slightly longer than the steel dies, and yielded consistently sharper impressions.

Applied to Hot Forging and Other Dies

"One plant reported favorable results with dies used in hot forging. If this experience is confirmed, the improvement may be due at least as much to the protection furnished by the chromium against oxidation as against abrasion. This application is somewhat similar to the use of chromium on glass molds that has been reported both in Germany and in America.

"Both spinning and burnishing tools may be classified as forming devices, even though the action of the latter is confined to the surface. Several favorable reports were received upon both of these applications of chromium. One of the most successful applications is upon dies used for molding plastic materials such as rubber, bakelite, ceramic clays, etc."

It was said that no definite information has been obtained regarding the use of chromium upon steel rolls employed for either hot or cold rolling of metals. "The great size and weight of the rolls used in many operations render their plating somewhat difficult," said Dr. Blum. "This application at least warrants careful study. Rolls used for finishing sheet metal would almost certainly have their life increased by plating."

Chromium Plated Cutting Tools

Data received regarding chromium on tools used for cutting metals were said to be more variable and less favorable than those for any other uses. "The general difficulty may be summed up by saying that if the chromium is thick enough at or near the cutting edge to exhibit its great hardness, it is likely to fracture, and if too thin, it soon wears off the edge and offers little advantage," he said.

"Nevertheless a sufficient number of successful applications were reported to show that, for some purposes at least, chromium deserves careful consideration. The value of chromium is no doubt affected by such factors as the angle and type of the cutting edge, the speed of cutting, and the material being cut. In at least a few cases favorable results have been obtained by plating only one side of the tool with a fairly thick chromium deposit. The tool can then be ground repeatedly upon the steel side, thus always leaving a cutting edge of chromium.

"Blanking dies furnish a good illustration of the difficulties with chromium plating, especially when they are used on hard metals such as steel. The impact is such that any fairly thick deposit is likely to flake, and thin deposits usually add but little to the service. On the other hand, such tools as milling cutters, reamers, drills, and taps have frequently shown a material increase in service after plating. Even then, however, the results are likely to be erratic. The most consistent gains are obtained when cutting such substances as slate, asbestos board, and bakelite, which materials, though commonly referred to as 'soft,' cause rapid wear of steel tools.

"The experience with saws of various types is like that with other cutting tools. If a thick coating is applied there is a marked tendency for the formation of nodules or 'trees' upon the points of the teeth. These dull the points, and if, as usually occurs, they break off in service they leave the teeth rough and irregular. For such articles it is therefore preferable to use relatively thin coatings. This conclusion is confirmed by the results reported for hack saws. Even with the thinner coatings they were not so satisfactory for cutting steel as for materials such as slate and asbestos.

"Files are somewhat similar to saws, in that any appreciable thickness of chromium tends to dull the files. It was reported by several persons that chromium-plated files show much less tendency to clog in use than unplated files. Whenever a material tends to fill the files, the use of light chromium coatings may be justified, even though the useful life of the file may not be greatly increased. In some cases, however, an increase to double the original service was obtained.

"A few reports upon woodworking tools, including saws, chisels, and lathe tools, show that their life is very greatly increased by the use of chromium coatings. Results with rock drills are still uncertain.

Few Applications to Machine Parts

"In spite of the apparently obvious applicability of chromium upon all parts of machinery that are subject to wear in service, such use is still far from being a general or even a preferred practice," said Dr. Blum. "The failure to adopt chromium for such purposes may be due to various causes, including the size or inaccessibility of many of the parts, and the fear that if the chromium should become detached from a bearing surface, the particles would serve as an abrasive and cause permanent injury to the mechanism. While the latter possibility warrants careful consideration and proper caution, the probability of its occurrence is not evident from the meager data available. These data, however, refer mostly to successful applications and furnish little or no evidence regarding many types of machinery upon which the chromium may have been tried and found wanting. If, as we suggested earlier in this paper, a lower coefficient of friction can be obtained and maintained on a chromium surface than on other metals, the use of chromium on bearing surfaces may prove beneficial. There is no justification, however, for assuming that the use of chromium will obviate the necessity for lubrication."

Not a Panacea for Wear

Successful application of chromium plating to automobile piston pins, gears for counting machines, Diesel engine piston rods and printing plates are outlined in the paper.

In conclusion, Dr. Blum said, in part:

"Chromium plating owes its application upon mechanical equipment primarily to its great hardness, as exhibited in its resistance to abrasion. The chief limitation in the use of chromium for such purposes is its extreme brittleness, which may cause it to crack and flake when deformed. . . . Chromium plating is not a panacea for wear. An everlasting tool or machine is as visionary as perpetual motion. Chromium plating has, however, solved many machine-shop problems, reduced costs of operation, and improved the quality of the products. When we recall that almost all this progress has been made in less than three years, there is good reason to hope and to believe that with the large number of investigators now at work on this subject, even greater results may be expected."

Symposium on Machine Tool Motor Drives

A SYMPOSIUM on motor application and control, presided over by E. F. DuBrul, general manager National Machine Tool Builders' Association, was a feature of the annual meeting of the American Society of Mechanical Engineers in New York.

The increased use of self-contained motor-driven lathes was emphasized by C. L. Cameron, Eastern representative Monarch Machine Tool Co., New York, in a paper on "Methods of Motor Application and Control on Lathes." The records of his company show production of upward of 90

per cent of the self-contained motor-driven lathes as compared to about 15 per cent 10 years ago.

"There has been a tendency among lathe builders, as well as builders of other machine tools, to recommend motors of far greater horsepower than is necessary for a given size of lathe," said Mr. Cameron in another part. "This over-motoring recommendation is the result either of ignorance on the part of the manufacturer or, more likely, of a desire to create in the mind of the buyer an inflated idea of the amount of power his machine is capable of handling."

Difficulties experienced because of a lack of standardization of motor sizes, armature shaft dimensions, motor bolt hole sizes, etc., were outlined by Mr. Cameron. Some of these difficulties are:

> "1. It is impossible to jig-drill and tap the motor plate. 2. It is necessary to fit each motor, lay off the holes, take the motor plate off the machine, drill and tap it, and then put it back again. 3. It is not possible to carry motor pulleys, sprockets, or sheave pulleys in stock, border and keywayed ready for use; each must be made up after the motor has been selected. 4. It is impossible to carry standard motors in stock. Frequently considerable delay is experienced waiting for customers to send certified prints and motor to the plant to be attached, entailing a loss of time and unnecessary freight expense. 5. Frequently customers neglect to have the proper starting apparatus sent at the same time with the motor, causing confusion and more delay and making it impossible properly to attach and inclose the wires between motor and starter. 6. It is almost impossible for lathe builders to consider the use of flange mounting due to the lack of standardization of frame sizes.

Best for Manufacturer to Provide Motor

"If the machine-tool manufacturer could include the motor and controller in his machine as a component unit without identity just as if it were a standard part of the machine, such as a speed gear case, the problem would be greatly simplified.

"As the range of motors used on lathes is between 2 and 15 hp., with probably 90 per cent of the motors of 7½ hp. and under, the manufacturer could carry in stock motors and starters of suitable voltage ready for instant application. Savings effected if this practice could be adopted would be greater than those which the users now think they make by buying their own motors, and, of course, these savings would be passed on to the users. Much time, expense and confusion would be saved, as everyone is familiar with the number of questions that arise when ordering a motor-driven machine, such as horsepower, voltage, speed, style of starter, switches, etc. These details have to be settled with every order that is taken when customers order their own motors.

"Wherever possible or practicable it is always advisable for the lathe manufacturer or the machine-tool manufacturer to mount the motor on the tool and do the necessary wiring. In this way the lathe can be tested out and operated under its own power before shipment to the user, and such wiring and motor application can be done at a lower cost by the tool manufacturer than by the user. This also shifts from the user to the manufacturer the responsibility of securing a perfect motor-drive application. There still remains the dual responsibility when the customer selects and purchases his own electrical equipment."

Generous use of anti-friction bearings throughout the headstock, quick-change gear box and apron was said to materially lessen the horsepower required to drive a lathe. The different types of driving motors for lathes, including the most prevalent, the constant-speed alternating-current motor, were briefly discussed. "The development of an a.c. variable-speed constant-horsepower motor having at least six or eight speed changes with a motor of reasonable size and price would revolutionize the design of lathe headstocks, as well as many other classes of machine tools," said Mr. Cameron.

Motor Equipment for Precision Grinders

Development of motor drives in grinding machines was outlined by R. E. W. Harrison, engineering director Cincinnati Grinders, Inc., Cincinnati, in a paper on "Motor Drives for Precision Grinding Machines."

"It is obvious that the tendency is toward the elimination of the transmission elements," said Mr. Harrison. "However, while this is highly desirable because it has the virtue of simplicity, there are difficulties in the way of successful applications to grinding machines that do not obtain on other types of machine tools."

"The one element which is the most prolific source of difficulty in the way of successful grinding operations is vibration, and until it is possible for motor manufacturers to produce motors that are free from vibration, it is doubtful if the practice of mounting the motor directly on the grinding-wheel spindle will become general. Vibrations due to end movement of the armature shaft are comparatively rare, but vibrations due to lack of dynamic balance are, unfortunately, frequent.

"Machine-tool manufacturers and the users, of course, realize the difficulty which confronts the motor manufacturer, this difficulty being due to the nature of the materials which the motor manufacturer has to use to attain his results. However, it is only a matter of time before an armature will be produced which will have the virtue of permanently correct dynamic balance, and, providing that the motors can be kept within the present limits of size, it will be then only a very short time before practically all motor-driven grinding machines will be made with the main drive motor as an integral part of the wheel head."

In speaking of motor mountings, Mr. Harrison said: "Considerations of floor space, time taken to install, and the fetish of neatness of appearance have brought about the use of the barrel-type motor without feet, in which the motor is carried on a flanged mount in the side of the machine. This is undoubtedly the best looking arrangement yet devised, but it entails difficulties in servicing which have led a number of users to specify alternative methods of mounting." Of the variable-speed motors used extensively up to 3 hp. for work-rotation drive, it was pointed out that so far a speed range of 3 to 1 has been the only one practicable, but that electrical manufacturers are developing a motor with a 6 to 1 speed range."

Of "across-the-line" motors, Mr. Harrison said: "This type of motor is rapidly becoming more popular, and while it costs a little more than the standard type of a.c. motor, the control panel is cheaper and offsets this extra cost. The chief advantage is its simplicity, and it is felt that it is only a matter of time before the electrical power supply companies so arrange matters that all machine-tool equipment calling for motors up to 30 hp. will be fitted with motors of this type.

"At the present time many supply companies are opposed to the installation of across-the-line motors on account of the rush of current involved in starting up. However, with such a motor and a suitable transmission element, with an adequate factor of safety to take care of the torque involved in starting up the mechanism, the equipment represents the best combination which the user of today can buy."

F. E. Cardullo, chief engineer G. A. Gray Co., Cincinnati, contributed a comprehensive paper on "Motors for Planer Service," and J. H. Mansfield, chief engineer Greenlee Brothers & Co., Rockford, Ill., presented a paper on "The Application of Motors to Special Drilling and Tapping Machinery."

Hacksaw Blades of High-Speed Steel

Power Machine So Fitted Held to Be Most Efficient Cutting-Off Tool

BY EDWARD S. NORVELL*

METHODS of cutting metal by saws have changed several times during the past 20 years. Briefly, 20 years ago metal was most generally cut on a production basis by means of cold cutting-off machines, using solid-tooth, circular metal-cutting saws.

At the time of the World War the power hacksaw machine came into favor, because the initial cost of these machines was less than for a circular inserted-tooth, circular metal-cutting blade with high-speed teeth, to keep up with the metal-cutting bandsaw.

First Use of High-Speed Steel Blades

These methods of cutting competed with each other from the end of the War until three years ago. In 1925 the genuine high-speed steel hacksaw blade was first put on the market. This blade has revolutionized all previous metal-sawing practice. With

THIS Power Saw Is Cutting 2-In. Round Forgings of Tough Vanadium Steel. The time taken was under 2½ min. to the piece and the average production exceeded 100 pieces for each saw

sawing machine, and because they could be operated with fewer attendants. In addition, blades could be changed quickly and a greater production was obtained from several power hacksaw machines than could be secured from the same amount of money and floor space invested in circular sawing machines.

The second stage in the development of metal cutting was the metal-cutting bandsaw machine. This machine was adopted by up-to-date metal-working plants, which threw out their circular cold sawing machines and power hacksaw machines, because the metal-cutting bandsaw machine was a more efficient tool. This was true since the blade cut continuously and there was no lost motion on the return stroke, and therefore it would cut more rapidly. In addition it was more economical, because none of the blade was wasted, because it removed a narrower kerf and because it required less power.

After the development of the metal-cutting bandsaw machine, the makers of cold sawing machines adopted an it a power hacksaw machine held all the advantages of a narrow kerf and in addition obtained the new advantages of a rapid-cutting blade and a blade which would wear so much longer that it was more economical than any other previously known method of cutting off stock.

Modern, up-to-date power hacksaw machines, such as the Atkins No. 18, the Peerless universal shaping saw and the Racine shear-cut machine, offer any plant that works metal on a production basis a new combination, with high-speed steel hacksaw blades which will cut their metal economically, rapidly and straight.

It will pay any firm that is sawing metal on a production basis to put in one or more high-grade production power hacksaws, and use genuine high-speed steel blades. This type of equipment has the following advantages on most cutting-off operations:

1—The blade expense is low.
2—The cutting cost will be low.
3—The labor cost will be low.
4—The production for a given investment in machinery will be high per day, because of the low initial cost of the machines. Therefore, more machines can be operated with less labor for the amount of money invested in sawing equipment.
5—High-speed steel hacksaw blades are highly standardized and a complete stock is carried by several supply houses in each industrial locality. Therefore, a user of a power hacksaw machine is never forced to stop work because he cannot immediately obtain blades for the machines, from the stock of a local source of supply.

A modern hacksaw machine combines the best qualities of a metal bandsaw machine with the best qualities of a circular sawing machine, as follows:

a—Removes a fairly narrow kerf.
b—It makes a smooth, straight cut.
c—It requires a minimum amount of power.
d—It requires a minimum amount of floor space.
e—One man can handle several machines alone.
f—The blades are heavy enough so that breakage is not a serious factor.
g—The blades can be resharpened.
h—The blades are heavy enough so that they will stand a heavy feed.
j—The machines are simple and can be operated by any workman of ordinary intelligence.
k—In case of accident, and where a blade is broken, the loss is not heavy.

*Manager Metal-Cutting Department, E. C. Atkins & Co., Indianapolis.

Flow Meter Joints Welded

TO secure permanent tightness in the new design of indicating flow meter made by the Meriam Co., Cleveland, the joints between pipes, fittings and valves are welded. Atomic hydrogen welding, which has been described publicly a number of times in recent months, is the method used, but it is thought that the Meriam company's installation is the first commercial application of the new process in the Cleveland region.

The meter is designed for measuring air, gas, saturated or superheated steam, oils and other liquids at any temperature, vacuum or pressure. Operation depends upon the fact that the flow of the liquid or gas causes a loss of pressure along the pipe. An orifice-disk of Monel metal is placed in the pipe, and two small tubes are connected, one on each side of the disk. The difference in pressure is recorded by a mercury column, and the scale may be calibrated in cubic feet, barrels, pounds, gallons, or any desired other quantity per hour.

Steel Freight Rate Case Hearings Soon

Arguments May Be Presented Beginning in January—Many Briefs Take Exception to Findings of Examiners on Mileage Scale

WASHINGTON, Dec. 11.—Arguments in the general steel rate structure case will probably be heard beginning in January. Replies to briefs of exceptions to the proposed report of Examiners Howard C. Faul and C. M. Bardwell are to be filed by not later than Dec. 31. The investigation, the most sweeping of the kind ever undertaken, covers all rates on manufactured iron and steel throughout Official Classification territory, and is being made under the Hoch-Smith resolution.

In their joint brief of exceptions to the proposed report, independent steel interests in the Chicago district protested against the proposed destination grouping. These interests included the Inland Steel Co., the Acme Steel Co., the Interstate Iron & Steel Co., Clayton Mark & Co., Joseph T. Ryerson & Son, Inc., the Crane Co., and the Northwestern Expanded Metal Co.

The examiners recommended that reasonable destination groups be permitted in connection with hauls of approximately 450 miles or over, but that reasonable destination groups be prohibited in connection with shorter hauls.

"This is equivalent to saying that reasonable destination groups to Illinois territory shall be prohibited from Chicago, but permitted from Pittsburgh, and from the context it would appear that this is the situation at which the distinction is deliberately aimed," said the brief. "We object with all the emphasis at our command to such unjust and gross discrimination, and respectfully insist that we are entitled to equal treatment with Pittsburgh. If reasonable destination groups are to be permitted we have as much right to enjoy them as has our huge competitor."

The Chicago district independents said that the examiners apparently condemned the existing destination groups in Illinois as not being in conformity with the requirements of the Jones & Laughlin decision. The contention was made that the present destination groups in Illinois are in all respects in compliance with that decision and that the commission has set its stamp of approval on these groups. It was urged that they should not be disturbed. The location of important competing lines and the observation of the long-and-short-haul rule was declared to compel the existing Illinois destination groups.

Deere & Co., implement makers, Moline, Ill., and the Chambers of Commerce of Rock Island, Ill., and Davenport, Iowa, asked for the adoption of rates on bars, plates and shapes, minimum weight 80,000 lb., not in excess of 75 per cent of the scale in effect on iron and steel articles in carloads, minimum weight 36,000 lb. These interests in the Tri-Cities also proposed a scale of rates which was prepared on the basis of a minimum of 6c., suggested by the examiners, but extended on the basis of 12c. for 100 miles and 24c. to 400 miles. It was maintained that rarely, if ever, does the rate for 100 miles exceed 200 per cent of the rate for five miles and that the rate for 400 miles rarely, if ever, exceeds 200 per cent of the rate of 100 miles or 400 per cent of the minimum rate. The brief supported the contention of F. A. Ogden, traffic manager of the Jones & Laughlin Steel Corporation, who cited the bearing the case had on the Hoch-Smith resolution in that the farmer is the ultimate consumer of a large proportion of the steel manufactured, and that the freight rate on steel is a part of his cost.

Dealing with the competitive situation, the brief pointed out that manufacturers in the Tri-Cities of agricultural implements, railroad cars, and other iron and steel products are in competition with manufacturers of similar articles at Chicago, who receive their bars, plates and shapes on a switching rate or on a low rate of 5c. per 100 lb. from Gary, Ind., as contrasted with a rate of 17c. from Chicago to the Tri-Cities. The latter rate would be increased to 19c. under the proposed scale. It was estimated that the Tri-Cities annually receive 500,000 tons of steel from the Chicago district, its principal source of supply.

St. Louis Groups File Exceptions

Sixteen exceptions to the proposed report were made in a brief filed by the East Side Manufacturers' Association, the Granite City Steel Co., Granite City, Ill., and the Laclede Steel Co., St. Louis. The exceptions covered a wide range, reflecting criticism throughout. These interests offered a scale which, it was declared, would establish a proper level of rates and meet the requirements of the Hoch-Smith resolution, purposes which, the brief said, were not met in the proposed report.

In the course of its contentions, the brief pointed out that to Michigan the Central Freight Association fifth class scale is universally applied and that the application of the examiners' scale would seriously distort the rate relationships between the long haul and short haul shippers. There is no indication, the brief said, that such increased disadvantage even on what tonnage may be moving could be absorbed to any extent whatever by the farther distant producing points. As illustrating the situation, the brief explained that the East St. Louis district at the present time must absorb 11.5c., 7.5c. and 6c., respectively, to compete with Cleveland, Chicago and Pittsburgh in the Detroit market, while, if the examiners' scale were applied, the difference would be 15.5c., 10c. and 9c., respectively. The rates from Cleveland, Chicago and Pittsburgh would be reduced from 23.5c. to 19.5c., 27.5c. to 25c. and 29c. to 26c., respectively. The rate from East St. Louis would remain 35c.

"This would mean an increased burden on the East St. Louis traffic of 80, 60 and 50c. per ton, respectively, a total differential to be absorbed of $3.10, $2 and $1.80 per ton against our Cleveland, Chicago and Pittsburgh competitors," said the brief. "There is no foundation in fact for the conclusion that the traffic could move freely from the East St. Louis district to Detroit when the absorption necessary to move it against our controlling competitors at Cleveland is equal to 7.5 per cent of the market price of the material, and this is only one instance of the general situation which would be brought about by the application of the examiners' scale."

Syracuse Objects to Paying Higher Rate

The Chamber of Commerce, Syracuse, N. Y., took exception to the statement in the proposed report that the level of rates is of much less importance to shippers generally than is their relationships. The chamber said it is obvious that the receiver of iron and steel products is vitally interested in the level of rates and should be so considered.

Exception also was taken to the proposed basic scale of rates to the extent that the rates for longer hauls are unduly high in their relationships to rates for short hauls. It was contended that the rate of progression of the scale inflates the rates for hauls from 300 or more miles. The rate from Pittsburgh to Syracuse, it was pointed out, is now on a full fifth class basis at 28.5c. per 100 lb., while the recommended scale would result in a rate of 30c. when using 370 miles as the distance from Pittsburgh to Syracuse. In other words, it was added, it would make the recommended commodity rate higher than the class rate. The chamber expressed the view that the scale should be modified to a lower basis.

Although taking exception to three points in the examiners' report, the

Bethlehem Steel Co. expressed its recognition "of the thorough, capable and fair treatment which the examiners in their proposed report have given the many intricate and important problems involved in this proceedings."

Objections were made to the rates of progression (or road haul factors) in constructing the proposed scale; to the method proposed for constructing rates to and from New York, and to the proposals with reference to grouping.

Bethlehem Claims Unjust Relationships

The Bethlehem company said its dissatisfaction with the proposed scale does not relate to its general level, but is based solely on the unjust relationships which it will create. It was claimed it would prejudice short-haul traffic and prefer long-haul traffic. It was contended that for relatively short hauls the rates would be padded apparently to protect carriers' revenues and that for hauls over 400 miles the rates would be increasingly depressed, apparently to stimulate long haul traffic. Regarding the terminal factor, the brief said that it is agreed that a minimum rate of 6c., of which 5.5c. is pure terminal factor, for hauls up to five miles will give more than full compensation for the total of all terminal service at both ends of hauls of all lengths. With the item of 5.5c. included in every rate, it was pointed out, terminal service is taken care of once and for all. There would be no terminal costs left over to be later "absorbed," it was declared.

Concerning road haul factors, the brief said the proposed scale would inflate Bethlehem's short haul rates and at the same time cut the rates of its long haul competitors so as to foster the latter's traffic as against the former's traffic. To produce a non-prejudicial scale, it was stated, there should be added to a proper minimum rate a way-train haul factor up to about 75 miles and thereafter a through train haul factor without further decrease. The ratio between the maximum or way-train factor and the minimum or through train factor, the brief maintained, should not be greater than as three is to two. The examiners, it was stated, have carried their maximum rate of progression through to 110 miles, for which it was asserted there is no justification. It was declared that it has the effect of forcing an extra cent into the scale at that point. The examiners also were declared to have tapered the rate of progression after 400 miles and it was added that there is no justification for this in transportation conditions. It has the effect, the brief said, of cutting the rates for long-haul traffic 1c. at 500 miles, 3c. at 600 miles, etc., a 2c. additional cut for each additional 100 miles.

If the proposed scale were approved, it was stated, shippers whose mills lie near their markets will be penalized approximately 20c. per ton, while their long-haul competitors "will secure a subsidy of that amount and upward as their hauls increase." The brief incorporated a compromise scale which, it was said, would do justice to short haul shippers and still foster long haul traffic through the diminishing rate of progression which the examiners had in mind. At 70 miles, the brief said, the compromise scale would produce a rate of 11.5c., as compared with the rate of 11.5c. approved for that distance in another case.

As this 11c. rate is the key rate of the Pittsburgh-Valleys short haul structure, it was stated, the carriers' revenues from the great volume of short haul traffic in that territory would be slightly increased. For hauls up to 200 miles the compromise scale would increase the present rates for such distances in the middle and Western districts and slightly reduce the present rates in the East, which were said to be much higher than those enjoyed by Pittsburgh and Chicago shippers. As the combined ingot capacity of the middle and Western districts is over 46,000,000 gross tons, compared with only 8,000,000 tons in the Eastern district, said the brief, it is obvious that the general effect of the compromise would be to increase the carriers' revenues for hauls up to 200 miles.

Object to "Constructive Miles"

Objections to the recommendation that in making rates to New York City 10 constructive miles be added in the case of long hauls and an arbitrary of 5c. scaled down to nothing at 110 miles be added in the case of short hauls were similar to those made by other producers in the Philadelphia district. It was contended that the proposal to inflate the rates to New York had no basis and would be discriminatory. The proposal to add 10 constructive miles to the actual mileage to New Jersey rail termini, it was declared, cannot be justified as a distance adjustment. It was suggested that the floating of a car for, say, three miles in New York Harbor may well be less expensive than the switching of a car three miles in Pittsburgh or Chicago, particularly when capital costs as well as operating costs are considered. Furthermore, it was stated, the terminal factor of 5.5c. in the proposed scale is more than ample to cover actual terminal costs at cities where terminal costs are the highest. The simple and direct way to handle the situation without discrimination was said to be to add the same arbitrary charge to every rate, if any extra charge is deemed necessary.

Objection was made to the recommendation to accord the privilege of destination groups, upon straight average mileage, to hauls of approximately 450 miles and over on the ground that it would result in a further favoring of long haul traffic as against short haul traffic.

Carriers in New England urged the commission to find that the classification basis is the proper basis for maximum reasonable rates between points in New England and between New England and other territories in both directions. They also objected to the recommendation that tariffs proposing class rates on iron and steel be canceled. At present, rates on iron and steel in New England are partly on a fifth class and partly on a commodity or classification basis. The carriers further contended that the proposed scale, if adopted, would result in decreasing their revenues.

Higher Rail Rates Will Add to Water Shipments on Lake

The situation created by water competition with rail lines between Chicago and Milwaukee was urged by the Milwaukee Iron and Steel Committee as fully justifying a departure from the proposed scale. It was declared that the carriers should be allowed sufficient latitude to deal with the situation. The committee further asked the commission to sanction the continuance of the differential method of constructing rates to and from Milwaukee and permit retention of existing groups and grouping arrangements between both central and southern Illinois territories. The committee said it could not feel that any good purpose would be served by abolishing these long continued arrangements and the substitution of the mileage scale suggested in the examiners' report.

Protest was made against any increase in the rail rate between Chicago and Milwaukee, a distance of 85 miles. A higher rate, it was asserted, would divert tonnage from the rail to the water lines. The preponderance of the iron and steel movement is now by rail, it was stated. Figures gathered from members of the committee showed that the northbound movement of five products from Chicago to Milwaukee involved 783,360,319 lb. (349,711 gross tons) during the first nine months of 1928 and this was said to represent about 85 per cent of the total iron and steel tonnage moving between the two points for the period mentioned. This movement was made up of 616,128,887 lb. (275,057 tons) of structural steel, 72,703,371 lb. (32,456 tons) of sheet steel, 10,992,000 lb. (4907 tons) of wire, 13,164,676 lb. (5878 tons) of pipe and 70,370,624 lb. (31,413 tons) of merchant iron.

Certain steel mills in the Chicago district, it was pointed out, have facilities for shipping by water and are going ahead with comprehensive plans for expanding their facilities for forwarding and receiving shipments by water, while the Milwaukee Harbor Commission was said to include in its harbor development plan a dock specially designed and constructed for the better handling of iron and steel articles "which cannot help but make the situation more acute with respect to this type of tonnage than it is today." This plan was said to have been undertaken in the light of existing iron and steel rates. Certain of the

larger receivers of iron and steel at Milwaukee, according to the committee, have given the most serious consideration to the establishing of their own barge lines to handle this tonnage between Chicago and Milwaukee and any increase in the existing rate, it was stated, will insure them going ahead in this undertaking.

Railroads Ask for Higher Rates

Railroads generally in Official Classification territory, in direct opposition to the attitude of the steel producers, asked the commission to observe the Hoch-Smith resolution by prescribing higher rates than those proposed in the scale. The inquiry on iron and steel is one of a number undertaken under that resolution.

"The examiners' scale is incompatible with the Hoch-Smith resolution," said the Eastern trunk lines, "in that it reduces rates on commodities on which no reduction is contemplated by that resolution." It was declared that commodities other than those of agriculture are not within the care of the resolution which provides for the "lowest possible lawful rates." On the contrary, it was stated, iron and steel are commodities which may properly be called upon to bear rates approaching the limit of maximum reasonableness.

"The Hoch-Smith resolution is addressed to the commission," these carriers said, "and this case presents to it the opportunity, and, we submit, the duty to make some revenue compensation to carriers for the losses the commission has felt obliged to impose as to other traffic under the resolution."

These carriers proposed a scale which, they said, would not yield excessive revenue. It was stated that the great need of the iron and steel industry is for proper relationships rather than reduction of rate levels. Central Freight Association carriers joined in this proposal and line of argument, and suggested adoption of the Disque scale. Southern lines urged that the official territory scale be confined to the territory north of the Ohio and Potomac Rivers.

Cleveland Argues Against Advance in Short-Haul Rates

The Cleveland Chamber of Commerce said that the proposed report should be corrected by substituting Lorain for Cleveland as the Western limit of short-haul territory. It also excepted to the proposed maintenance of the Johnstown and Cumberland differentials on eastbound traffic. Undue emphasis was said to have been placed in the proposed report in the statement that the level of the rates is of much less importance than is their relationship. It was stated that such emphasis has resulted in the construction of a mileage scale seriously injurious to Cleveland interests and resulting in unreasonably high rates. Exception was taken also to the basic scale of rates to the extent that it would result, the brief said, in unjust and unreasonable rates within short-haul territory. As to long-haul business, the brief declared that the Cleveland interests ask simply to be given the same rate base as any of their competitors. It was urged that it is unjust to the business of Cleveland to force serious advances in its short-haul rates "by reason of an apparently arbitrary desire to maintain present Pittsburgh-New York and Pittsburgh-Chicago rates." It was further contended that the proposed scale should be modified to start with an initial figure of not more than 5c. for a distance of 15 miles and under and progress so as to reach a figure of not more than 9.5c. at 60 miles.

Buffalo Producers Urge Against Undue Advantage to Any Group

The Niagara frontier iron and steel interests particularly asked the commission to prescribe a basis of rates materially lower than that recommended and that it be applied in such a manner as to avoid undue preference or advantage to any group of shippers. These interests, including the Buffalo Bolt Co., the Donner Steel Co., the Seneca Iron & Steel Co., and the Wickwire Spencer Steel Co., stated, however, that on the whole the proposed report points the way toward a much more logical and enduring basis of rates for iron and steel articles than has heretofore prevailed. One serious departure was said to relate to long-haul rates against short-haul rates. The middle group, including shippers in the Pittsburgh and Buffalo districts, it was said, contended for relatively low rates for long hauls because their principal markets are located 400 miles from the place of manufacture and because their competitors are located in or near the principal markets.

Another group of manufacturers, it was pointed out, consisting principally of those along the Atlantic seaboard and in the Chicago district, contended for relatively high rates for long hauls and relatively low rates for short hauls for the purpose of excluding their Pittsburgh and Buffalo competitors from the markets to which their own plants are in close proximity. From a priori viewpoint, it was stated, it would seem impossible for a judicial determination of this controversy to result in favoritism to one group or the other. Yet, it was stated, the report, while providing that between 300 and 900 miles the full sixth-class rates as recommended in the Eastern Class Rate investigation shall apply, provides for distances less than 300 miles definite concessions from the sixth-class basis. The apparently unfair treatment of the middle district, the brief said, is due to a hump in the middle of the scale, distances between 300 and 600 miles, caused by an unusual rate of progression. It must not be overlooked, it was said, that distances between 300 and 600 miles are especially important to the Niagara frontier manufacturers because they reach both New York and Chicago at these distances. The Niagara frontier interests, it was maintained, do not ask for any concession in rates for those distances, but they emphatically protest against a construction of the scale in such manner as to penalize them for distances which are more important to them than any other in the entire scale.

The Illinois Rate Committee lines objected to the proposed groupings and asked that the Jones & Laughlin groupings as they now exist be maintained. The present groups were declared to reflect relationships that should not be disturbed.

Philadelphia Mills Take Exceptions

In a joint brief filed by the Alan Wood Iron & Steel Co., the Phoenix Iron Co., the Lukens Steel Co. and the Worth Steel Co., this group of mills in the Philadelphia district excepted to a number of recommendations made in the tentative report. Exceptions were taken to the manner of breaking up mileage blocks, to the phrase "east of" Philadelphia adopted in proposing arbitraries between so-called short-haul trunk line territory and New York City groups, to the proposed dual penalty in connection with the arbitraries, to the proposed adoption of basing points applying to joint rates, and to proposed differentials to Atlantic seaboard ports.

The brief declared that in so far as the proposed mileage scale applies for distances from 75 to 170 miles the Philadelphia mills object to the recommendation setting maximum rates, 36,000-lb. carload minimum, with certain exceptions, between points in central territory. The scale proposes rates 6c. per 100 lb. for each mileage block of five miles and under up to 56c. per 100 lb. for 1200 miles and over 1165 miles, with an additional ½c. for each block up to 280 miles when the rate of progression is 1c. per 100 lb. throughout the remainder of the scale, which is broken into blocks of five miles up to 110 miles. From 110 to 260 miles the blocks are 10 miles each; to 400 miles, 20 miles each; to 500 miles, 25 miles each and to the remainder of the scale, 35 miles each. The Philadelphia mills contended that there should be a break in the road haul factor at shorter distances than 110 miles, and proposed a distance of 75 miles. It was declared this should be accomplished by interposing a range of distances and the accompanying rate of progression between 75 miles and approximately 170 miles, meeting the proposed scale at the latter rate. The proposed modification in the distance range, it was stated, would fit a straight line between the points on the resultant curve at 75 to 170 miles as nearly as may be practically done by rates avoiding fractions other than halves. The brief said the rate of progression should properly be varied at 75 miles when the effect of the way train movement of the traffic ceases on the average or at least rapidly becomes of decreasing importance and proportion and that the scale recommended by the examiners postpones too long the flattening out of the rate of progression.

Labor Demands Efficient Management

New Functional Status for Workers Urged at Taylor Society Meeting—Broad Aspects of Shorter Work Period

RECOGNITION by scientific management of the definite functional status in industry to which the labor groups are entitled was emphasized at the annual meeting of the Taylor Society, held in New York, Dec. 5 to 7. In his presidential address, Morris Llewellyn Cooke, consulting engineer, Philadelphia, urged the members to give more consideration to this ever more important phase of industrial management. In substance, Mr. Cooke stated that "the interests of society, including those of the workers, suggest some measure of collective bargaining in industry to the end that the weaker side may be represented in negotiations as to hours, wages, status and working conditions. Collective bargaining implies the organization of the workers on a basis extensive enough as to make this bargaining power effective. But a bargaining position which implies division into two camps, fundamental as it now is admitted to be, must, in a world abandoning competition for cooperation, gradually give way so that if the group cohesion of the workers is to be continued it will be through giving labor organizations that functional status in the industrial process which is now denied. This can be done only through the discovery of elements of the work which can be as well or better done by the group than by individuals.

"If the labor organizations are in fact desirable social agencies and essential to the orderly conduct of industry, they logically come within the field of management and industrial engineering. It therefore becomes a part of our task to discover all necessary outlets for the energy and spirit of the grouped workers and to aid in the cultivation on the part of both management and labor of those newer disciplines which will effect the maximum cooperative effort."

Cooperation with Management

Mr. Cooke pointed out that in recent years the principal grievances of organized labor, such as low wages, long hours, unsatisfactory working conditions, etc., which were formerly responsible for banding the workers together for a common interest, have now been largely eliminated. It is argued by some that group activity now has nothing further to do unless perhaps to secure the highest degree of cooperation on the part of each individual in carrying out the behests of management. It is also argued, the speaker continued, that the functional work of management does not need to be supplemented by the group, except as management using its own initiative may from time to time delegate to the group isolated tasks, which, in the opinion of such management, may better be performed by the group than by management itself.

Evidence of labor's growing demand for effective and economic management was claimed in a paper by Geoffrey C. Brown, consulting engineer, East Orange, N. J.

Problems in Marketing Equipment

IN a paper on the "Marketing Problems of Manufacturers of Equipment," Ralph H. Dick, president Barrington Associates, Inc., New York, stated that marketing activities had not until recently received the attention accorded to production problems because the chief executive officers of most companies had been more interested in volume than distribution. Also sales work deals with imponderables and management has hesitated to apply scientific principles to it. Another factor in the lack of development of sales technique has been in the payment of the sales manager's salary. His bonuses are ordinarily based entirely upon volume of sales and this has naturally not led to a concentration on margins of profit.

The marketing of equipment, Mr. Dick pointed out, involves a number of factors not common to other marketing activities. In the first place, buyers of equipment are usually technically trained men. The sale has a direct bearing on the profits of the purchasing company, and a difficult type of competition is encountered in buyers who think they can make the equipment satisfactorily in their own plants. More important than all is the fact that the equipment cannot be sold and forgotten about. The manufacturing company must be prepared to provide competent service on the machine. The equipment salesman should consequently be able to talk the language of the buyer and he should be backed by demonstration of the product, bringing out the use of the laboratory in developing the machine to its highest efficiency. The completion of the sale should be made by a competent engineer. It should be remembered that marketing of equipment involves both the product and engineering service. All sales activity should be backed by sound market research, which should not be used merely in case of emergency, but to avoid emergencies.

A paper on the "Marketing Problems of Manufacturers of Resale Goods," by Willard E. Freeland, Freeland & Warren, Boston, appears elsewhere in this issue.

Broad Aspects of Shorter Work Periods

IN suggesting a comprehensive approach to the problems of the shorter work day and the shorter work week, H. S. Person, managing director of the Taylor Society, emphasized the fact that these problems are merely aspects of a larger question which also includes technological unemployment, group insurance, old age pensions, etc. In approaching a solution he stated two propositions which should constantly be kept in mind: first, that "the standard length of the work period should be governed primarily by the maximum amount of work, scientifically determined, that workers can do and thrive under, proper allowance being made for adult education, recreation and other cultural factors, and second, that a substantial portion of the larger social income which results from marked increases in technological efficiency should be handled as a credit which shall be drawn upon by workers after middle age, when physical capacity and productivity decrease as a result of age and of inflexibility in adjustment to new technological conditions."

In other words, just as provident individuals plan to work hard during the earlier part of life so that through income from savings they may enjoy relative independence and comfort during the latter part of life, each generation as a group should so organize the distribution of its social income that individuals collectively may enjoy similar benefits. Instead of converting increased social income into a shorter work week or work day, thus emphasizing immediate leisure and spending, a substantial portion might be converted into ultimate leisure and comfort, enhanced in value by security.

Doctor Person pointed out that pressure is growing for prompt conversion of income from technological efficiency into shorter work periods, but at the same time there has been a growing sentiment in favor of unemployment insurance, old age pensions and other mechanism for the relief of the maladjusted, conceived in a form which makes them a charge upon industry. He admitted objections to this form of approach to the shorter work period problem on the grounds of its possible impracticability in modern capitalistic society, but at the same time called attention to

the growing interest of workers in activities which provide security in old age.

New Officers Elected

Henry P. Kendall, president of the Kendall Co., Boston, was elected president of the society for the coming year, succeeding Morris Llewellyn Cooke. Henry Bruere, first vice-president Bowery Savings Bank, New York, was made vice-president, and Edward W. Clark, 3d, of E. W. Clark & Co., Philadelphia, was reelected treasurer. Morris E. Leeds, president Leeds & Northrup Co., Philadelphia, and Edwin H. Schell, consulting management engineer and professor of business management at the Massachusetts Institute of Technology, Cambridge, Mass., were elected to the board of directors, succeeding N. G. Burleigh and A. B. Rich, Dr. H. S. Person, managing director of the society, was made a director for another term.

Power Transmission Association Meets

Merchandising and Engineering Advisory Boards Submit Reports—Eight Directors Elected

REVIEW of accomplishments of the past year and recommendations for future activities were presented by the various committees of the Power Transmission Association at the annual luncheon and business meeting of the association held at the Hotel Commodore, New York, Dec. 6.

A large number of members and guests listened with interest to the opening remarks of President W. H. Fisher, secretary T. B. Wood's Sons Co., Chambersburg, Pa. At the conclusion of his address he was given a rising vote of thanks for his able service to the association, which is now in its third year.

Most of the effort of the association during its first two years has been in establishing a good foundation upon which to work, said Mr. Fisher. "While it is difficult to enumerate many actual accomplishments, because of the practical impossibility of securing tangible evidence as to when and where our efforts have guided users to consider our arguments and use our products, it is nevertheless a fact that our work has created an atmosphere that is inspiring to the consideration of transmission problems in a more unbiased manner than has prevailed in the past," he said.

Credit for this condition was given the association's merchandising advisory committees, which obtained through the cooperation of member companies a large amount of advertising space in a number of trade and technical magazines for its "Drive Right" campaign. The "Drive Right" booklet has been sent to more than 30,000 users of transmission equipment.

Activity of the board of advisory engineers in obtaining constructive data for power users and in general research work were also commented upon favorably. Contacts of Secretary Hays with research groups in the power-using industries and his attendance at conferences with Government departments and meetings of trade and technical societies related to the association's field were also emphasized. Appreciation of the generous cooperation of the business press and of the New York and Chicago power shows was expressed.

The report of the association's board of advisory engineers, which is made up of 25 engineers from 20 different industries that are large users of transmission equipment, was presented by William Staniar, belting and transmission engineer, E. I. du Pont de Nemours & Co., Wilmington, Del. During the past year the board has answered a number of technical inquiries addressed to the association and has assisted in the preparation of articles relating to the lubrication and maintenance of mechanical transmission equipment. General test data has been analyzed and published by the board for the benefit of members of the association.

It was recommended that the association keep in touch with the study of obsolescence to be undertaken by the Department of Commerce. It was suggested that development of simple apparatus for testing alinement of shafting be taken up again with the National Electrical Manufacturers Association. Continuation of standardization work was advocated.

Creation of a power transmission division, to provide a forum for the discussion of transmission problems, was said to be under consideration by the American Society of Mechanical Engineers.

In view of the compilation of a comprehensive work by the leather interests of the association and the recent publication of a volume on "Mechanical Power Transmission" by Mr. Staniar, the publication of a handbook by the P. T. A. during 1928 was considered inadvisable. A condensed data book has been prepared and its publication in Lefax form was recommended by the board of engineers. This book will fill a longfelt want and can be featured in the association's advertising, said Mr. Staniar. Cooperation of the association in revising mechanical transmission data has been offered publishers of all handbooks.

W. W. French, advertising manager, Dodge Mfg. Corporation, Mishawaka, Ind., reported for the merchandising advisory committee, of which he is chairman. The report reflected substantial activity. W. S. Hays, 644 Drexel Building, Philadelphia, executive secretary of the association, gave an account of his activities for the association, and L. H. Shingle, president Shingle-Gibb Leather Co., Philadelphia, submitted his report as treasurer. All committee recommendations were referred to the association's executive board for action. The business meeting was preceded by a breakfast meeting of the association's board of directors.

The following directors, representing the various divisions of the association, were elected: G. B. Mitchell, vice-president Union Drawn Steel Co., Beaver Falls, Pa., power transmission division; E. H. Ball, president Chicago Belting Co., Chicago, leather belting division; Z. F. Harshton, general manager Imperial Belting Co., Chicago, fabric belting division; and A. E. Pyott, Pyott Foundry Co., Chicago, pulley division. Also H. T. Hallowell, president Standard Pressed Steel Co., Jenkintown, Pa., hanger division; W. D. Young, vice-president Cling-Surface Co., Buffalo, accessories division; H. W. Boyd, president Armour Leather Co., Chicago, tanners and curriers leather division; and R. J. Howison, Whitney Mfg. Co., Hartford, Conn., chain gear and speed mechanisms division.

Michigan Leads in Output of Malleable Castings

WASHINGTON, Dec. 11.—Commercial malleable iron foundries of the United States produced 585,616 net tons of castings, valued at $81,064,855, in 1927, a decrease of 17.8 per cent in tonnage and 20 per cent in value as compared with 712,499 tons, valued at $101,348,758, in 1925, according to data collected by the Bureau of Census in the biennial census of manufactures. Michigan, with 121,972 tons, valued at $14,211,523 in 1927, led as the source of production, while Ohio ranked second with 80,932 tons, valued at $11,020,268. Figures for 1927, the bureau pointed out, are preliminary.

Production by States for 1927 follow:

	Net Tons	Value
United States:		
1927	585,616	$81,064,855
1925	712,499	101,348,758
States: 1927		
California	5,926	1,033,742
Connecticut	15,532	3,351,351
Illinois	79,165	10,359,792
Indiana	62,943	8,266,416
Michigan	121,972	14,211,523
New Jersey	7,973	1,855,539
New York	63,142	9,804,938
Ohio	80,932	11,020,268
Pennsylvania	41,029	6,995,557
Wisconsin	77,178	9,378,027
All other States[1]	29,824	4,787,708

[1] Delaware, Georgia, Iowa, Maryland, Massachusetts, Minnesota, Missouri, Rhode Island, Tennessee, Texas and West Virginia. The figures for these States are combined to avoid disclosing the production of individual foundries.

Metal Tariff Hearings in January

Sweeping Changes Believed Unlikely but Upward Revision May be Sought on Bars, Shapes, Cast Iron Pipe and Other Products

BY L. W. MOFFETT

WASHINGTON, Dec. 11.—Changes in the metals schedule of the Fordney-McCumber tariff act when that law is overhauled promise to be limited when compared with the 300 items, more or less, in the schedule. It is unlikely that any of them will be of a sweeping character. The more important revisions may pertain to reclassification and administrative features rather than to duties.

There will be demands, however, for important changes in the metals schedule. This schedule will be the object of hearings on Jan. 14, 15 and 16 before the House Committee on Ways and Means. No schedule has been given more than three days for hearings. The hearings, 31 in number, are to be begun on Jan. 7 and will extend through Feb. 25.

The House committee has adopted a policy of not announcing those who have applied to be heard or of stating the names of the products which will be discussed. It is therefore not possible to say definitely what subjects will be presented in connection with hearings on the metals schedule. Developments under the existing law, however, lend a basis for the belief that a number of items will be discussed. Among them probably will be reinforcing bars, structural shapes, deep-section interlocking sheet piling, cast iron pipe, manganese ore, cutlery, pig iron, tungsten and certain types of machine tools. At its annual convention here last week the American Mining Congress adopted a resolution for continued protection to the minerals industry.

Producers May Ask for Higher Duties on Bars and Shapes

Domestic manufacturers have long expressed dissatisfaction over duties applicable to reinforcing bars and structural shapes and have complained about the volume of imports of these products. Concern manifested has been increased by the recent decision of Justice I. F. Fischer of the United States Customs Court, Second Division, who held that deformed bars are structural material and as such are dutiable under paragraph 312, taking an impost of 1/5c. per lb. or 20c. per 100 lb., instead of under paragraph 304, carrying a duty of 3/10c. per lb. or 30c. per 100 lb. It is reported that efforts will be made to get a separate classification for reinforcing bars with a duty higher than that applying under the decision of Justice Fischer. It is also understood that attempts will be made to get higher duties on structural shapes and deep-section interlocking sheet piling, the latter classified as structural material, a classification which does not meet with the approval of domestic makers. Consequently, reclassification may be sought for this product. Formerly this particular kind of sheet piling was imported exclusively, chiefly from Germany. It is now made in the United States and manufacturers maintain that it requires greater protection to support the industry adequately against foreign competition.

Belgium is the principal source of imports of structural shapes and bars which, it is held, have been sold into this country at prices which domestic manufacturers often are unable to meet. Most of the structural shapes imported are of the bar size, used for such purposes as lintels, fire escape construction, warehouses, coping work, and other small work. Reinforcing bars coming from abroad have competed more generally in construction work with domestic bars of that type than have imported structural shapes competed with large structural shapes.

Cast Iron Pipe Imports Heavy

Many complaints have been made by domestic producers against relatively heavy imports at times of cast iron pipe, dutiable at 20 per cent ad valorem. A great volume of these incoming shipments originate in France with a substantial proportion coming from Belgium. There is now pending a complaint before the Tariff Commission seeking an increase of 50 per cent under the flexible provision (Sec. 315) in the duty on this product.

Ferromanganese and Manganese Ore May Again Be Contested

Manganese ore was one of the subjects of heated discussion at hearings when the Fordney-McCumber tariff legislation was under consideration. Domestic iron and steel producers generally argued for either a low duty or no duty on this product, and complaints have been made before the Tariff Commission asking for a reduction of the duty of 1c. per lb. on the metallic manganese content when in excess of 30 per cent. Requests also have been made to have the ferromanganese duty of 1 7/8c. per lb. on the manganese content reduced. The duties on both products may again be the subject of vigorous contest before the Ways and Means Committee and the Senate Committee on Finance by producers and consumers. But it has been indicated that ferromanganese will play a less important part in the hearings than heretofore because of a much larger domestic production by steel works furnaces of the ferroalloy since the present tariff act was passed. Moreover, a reduction in the duty on ore would foreshadow a cut in the duty on the alloy. Domestic producers of manganese ore through the American Manganese Ore Producers' Association have made it plain ever since they organized that they will oppose a reduction in the duty. They contend that they are making progress through beneficiation in developing ore of good manganese content and that given continued protection they will be able to proceed with their research work and processes so that they can meet all domestic requirements for the making of standard ferromanganese. Domestic iron and steel producers generally do not accept this view. General investigation of the manganese situation was completed some time ago by the Tariff Commission and will be the subject of a report soon to be made, it is believed. This inquiry was not instituted under the flexible provision but rather upon the initiative of the commission itself under another section of the act.

Pig Iron Producers May Also Seek Higher Tariff

Interest in the pig iron duty is confined chiefly to Eastern merchant blast furnace operators and importers. Producers succeeded, on the strength of large imports which were entering the country, in having the Tariff Commission make an investigation under Sec. 315, which resulted in a proclamation by President Coolidge increasing the duty by 50 per cent, of 37.5c., from 75c. to $1.125 per gross ton. The Tariff Commission in its report on pig iron said that differences in costs in the United States and abroad indicated that a higher duty than was warranted under Sec. 315 was required to protect the American industry. It has been suggested that this would afford domestic makers a strong argument for seeking a higher duty. Imports of pig iron during the past few months have been light. For the 10 months ended October, 1928, they totaled 118,885 tons, as against 102,127 tons for the corresponding period of last year.

Producers of tungsten ore are known

to be preparing to ask higher rates on this product as well as on its manufactures, including ferrotungsten and tungsten steel, which take compensatory duties.

Machine Tool Builders May Seek "Unfair Trade" Protection

It is reported that machine tool manufacturers will make protests against certain kinds of imports and seek further protection. There has been considerable complaint that Germany is making "Chinese" copies of American machine tools, but without the high quality or efficient performance of the latter. On the other hand, it is claimed that there are some high-grade German tools imported into the United States which are invoiced at remarkably low figures. In some quarters it has been asserted that action might be taken for application of the "unfair trade practices" section of the tariff act, carrying the drastic embargo power.

Two other items of interest to the iron and steel industry which may be the subject of hearings are magnesite and fluorspar. They were the object of conflicting testimony at the hearings when the present act was in the course of preparation. Magnesite, however, apparently does not share the interest it formerly did. Imports have been light recently, and have not been heavy for a long period, owing evidently to the ability of domestic producers to meet foreign competition. Eastern iron and steel makers chiefly are interested in the duty on fluorspar. It recently was increased by 50 per cent, or $2.80 per gross ton, from $5.60 to $8.40, by Presidential proclamation following a report by the Tariff Commission based on a complaint under the flexible provision by domestic producers. Eastern iron and steel manufacturers had asked for a reduction in the duty.

Sweeping Changes Are Believed to Be Unlikely

The plans of the Republicans to overhaul the entire tariff law are consistent with pledges made during the recent Presidential campaign. By general revision was meant the purpose to go through the whole law and make all the changes at one time as contrasted to piecemeal revision. It is hardly believed, however, that the Republicans will proceed to the point of making sweeping changes in duties applying to the present Republican tariff. The changes contemplated, it is held, are largely required to meet economic and industrial adjustments that have developed since the existing law went into effect in September, 1922. Contention is made that the law has, in the main, operated quite satisfactorily throughout.

The changes in prospect, then, may be looked upon as a sort of leveling-out process, a form of readjustment to meet present-day conditions of competition. Changes in administrative sections are to be the subject of discussion on the last day of the hearings before the Ways and Means Committee. Much interest is being shown as to the possible revision or repeal of the flexible provision. It has been the source of a great deal of complaint. One objection is that it has been difficult for the Tariff Commission to ascertain costs of production from foreign manufacturers. Another is that this procedure has required such protracted investigation that frequently before the commission has been able to report to the President conditions existing at the time complaints were filed have changed entirely. Meanwhile, the domestic industry had to endure conditions complained of without getting relief at the time it was needed. A great deal of contention has been made that it would have been more satisfactory had the commission relied entirely on foreign invoices on imports, a resort turned to in instances where costs abroad could not be obtained.

There also is considerable sentiment that the right to charge duties should be restored exclusively to Congress and the Tariff Commission be maintained solely as a fact-finding body, reporting to Congress alone.

American Valuations Suggested

There has been renewed discussion also of having duties based on American valuation instead of on foreign valuation. This question was discussed with considerable warmth when the present law was being considered. The foreign valuation basis was continued, except as to some items in the chemical schedule. The general view seems to be that it will not be changed. One argument is that foreign valuation can be more easily justified at the present time owing to greater stability of foreign currencies than it could in 1922, when foreign currencies fluctuated widely.

An important provision which may be asked for in the new law by domestic steel makers is a requirement that imported steel bear a mark showing the countries of origin.

Plans to begin hearings early in January look to speedy enactment of a revised law under the Hoover administration. It is the prevailing opinion that an extra session of the new Congress will be called for the spring by Mr. Hoover shortly after the present session comes to an end. Agricultural relief could also be provided. Such action is not expected to be taken at the present session.

Wants Special Session Postponed

Senator David A. Reed, Republican, of Pennsylvania, a member of the Finance Committee, is in favor of deferring the special session until next fall, but this is plainly a minority view. In the view of a spring session, however, Senator Reed has conceived the unusual idea that the Finance Committee should take the revised tariff bill as prepared by the House Committee and proceed with changes and revisions which the Senate committee may deem necessary without awaiting passage of the bill by the House. This would be done on the theory that the bill would be passed by the House practically in the form in which it will be reported by the Ways and Means Committee. With the Senate Committee proceeding under the Reed plan, the bill would be whipped into form ready to go before Congress as soon as Mr. Hoover returns from his South American trip and calls a special session. Chairman Smoot, Republican, Utah, of the Senate committee, has not indicated whether he approves of the Reed plan.

Bill May Be Rushed

Chairman Hawley, Republican, Oregon, of the House Committee, has expressed the belief that the committee can meet after the present session and have a tariff bill ready to present the middle of April or the first of May should President-elect Hoover call an extra session in the spring. Mr. Hawley also said he thought that the House could dispose of the measure in 10 days or two weeks. This would be rapid-fire action for such an important piece of legislation, even for the House of Representatives.

Showing the intensity with which the House committee is proceeding with its tariff-revision program plans is the fact that the Tariff Commission has been required to have ready by the end of December a report on each of the thousands of items, together with the administrative sections, in the entire law. Report will be made to committee. The commission staff is now busily engaged in preparing this report, which is a big task.

Oral testimony before the House committee will be confined, so far as practicable, to those who are qualified to give first-hand information. The committee has suggested that, in order to avoid duplication of arguments and to conserve time, those interested in the same items and having the same problems to present, agree, if possible, upon one representative to present their views. With regard to briefs, industries have been asked to file two copies in advance of their particular hearings, stating changes desired, the reasons therefor, and other material information.

Four Companies Taken Over By Foote Brothers

Stockholders of Foote Brothers Gear & Machine Co., Chicago, have approved an increase in authorized common stock to 250,000 shares, par $5, from 120,000 shares, par $5. The issuance was also approved for shares for the acquisition of stock control of the Lyle Culvert & Road Equipment Co., the Stockland Road Machine Co. and the Northwestern Steel & Iron Co., all of Minneapolis, and the Bates Mfg. Co., Joliet, Ill.

Program for Western Metal Congress

Steel Treaters Announce Speakers for Semi-Annual Meeting at Los Angeles in January

PREPARATIONS are rapidly maturing for the first Western Metal Congress and Western States Metal and Steel Exposition, which will be held in Los Angeles, Cal., Jan. 14 to 18, under the auspices of the American Society for Steel Treating. The congress is to be held at the Hotel Biltmore and the exposition in the Shrine Civic Auditorium.

Dr. Kotaro Honda of the Imperial University, Sendai, Japan, will be present to deliver a paper before the convention and to discuss other technical contributions to the program. Dr. Zay Jeffries, Cleveland, president of the A.S.S.T., is expected to deliver a paper on the use of aluminum in the construction of airplanes.

The following tentative technical program for the congress has just been made public:

MONDAY, JAN. 14

10 a. m.—Prof. W. H. Clapp, department of metallurgy and machine design, California Institute of Technology, Pasadena, Cal., chairman. Papers:

"The Importance of Shops in University Training," by Arthur B. Domonoske, executive head mechanical engineering department, Stanford University; "Gear Manufacturing, Including Heat Treatment," by F. A. Brooks, chief engineer Johnson Gear Co., Berkeley, Cal.; "Investigation of Fatigue Resistance of Eutectoid Carbon Steel When Drawn at Different Temperatures," by Mr. Watson, metallurgist Regan Forge Co., San Pedro, Cal.; "Heat Treatment of Dies, Tools and Gears," by Jordan Korp, Leeds & Northrup Co., Philadelphia.

2 p. m.—Foundry Division Program (Sponsored by Metal Trades and Manufacturers Association, Carroll A. Stilson, secretary); Mr. Stilson, chairman. Papers:

"Special Nickel Castings," by Paul D. Merica, assistant manager of research, International Nickel Co., New York; "Sand Testing Equipment and Demonstration," by A. A. Grubb, Mansfield, Ohio, (member of American Foundrymen's Association, sand testing committee); "Nickel-Chrome Alloy Iron," by W. R. Shimer, metallurgical engineer Bethlehem Steel Corporation, Bethlehem, Pa.; "Heat Treatment of Carbon and Alloy Steel Castings," by J. E. Donnellan, of the A. S. S. T., Cleveland, secretary recommended practice committee; "Furnaces," by R. E. Talley, president George J. Hagan Co., Pittsburgh.

TUESDAY, JAN. 15

10 a. m.

"Selecting Metals and Alloys for Severe Services Involving Corrosion, Erosion, and Heat Resistance, with Particular Reference to Oil Refinery Conditions," Speaker to be announced. "Valves and Fittings in the Oil Refinery, the Materials Used in Their Construction, Their Design, and Their Application in Particular Services, and High-Pressure Oil Conveying and High-Pressure Gas Distribution." Speaker to be announced. "Tendency toward Higher Steam Pressures in Both Marine and Stationary Services, the Materials Available for the Construction of Boilers for these Higher Pressures, and Some of the Factors Involved in their Design," by Robert L. Daugherty, professor mechanical engineering, California Institute of Technology. "Heat, Insulation and Insulation Materials, their Properties and their Applicability for Particular Conditions Met with in Furnace Design, Industrial and Marine Boiler Services, and Services in the Chemical Industries Involving Corrosive Conditions Combined with High Temperatures." Speaker to be announced.

2 p. m.—American Society of Mechanical Engineers, H. H. Anderson, chairman of program committee.

The arrangement thus far made for this group for their particular session is in the form of a symposium of five papers on the manufacture of oil field specialties: "Tool Joints," by E. W. Goesor, Emsco Derrick & Equipment Co., Los Angeles; "Cast Steel Slush Pump Cylinders," by Lester Keim, Oil Well Supply Co. of California; "Kellys, or Grief Stems," by E. W. Timbs, National Supply Co.; "Sucker Rods," by W. H. Laury, Axelson Machine Co.; "Heat-Treated Drill Pipe," by a representative of the Standard Seamless Tube Co.

These five papers will be rather similar in the method in which the material is organized, touching chiefly upon the service to which they are subjected, the raw material used, together with its physical property, the forging and heat treating of same, the gaging and control of production.

WEDNESDAY, JAN. 16

10 a. m.—American Petroleum Institute, California Division of Development and Production Engineering, A. C. Rubel, district chairman, Union Oil Co., T. E. Swigart, national vice-chairman, Shell Co. Four papers scheduled:

"Sucker Rod Strains and Stresses," by F. W. Lake, Union Oil Co.; "Drill Pipe Failures," by Ben Stroud, National Tube Co.; "Casing Failures," by K. V. King, of Standard Oil Co. of California; "Welding and High-Pressure Gas Distribution," by C. J. Coberly, of Kobe, Inc.

2 p. m.—American Institute of Mining and Metallurgical Engineers, Glenn Robertson, Associated Oil Co., chairman of program committee and secretary. R. R. Boyd, chairman of the group, Richfield Oil Co. Four papers scheduled:

"On the Double Diagram of the Iron-Carbon System," by Dr. Kotaro Honda, research institute for iron and steel, Imperial University, Sendai, Japan; "Proposed Metallurgical Control for Small Heat-Treating Plants," by Dr. Welton Crook, professor of metallurgy Stanford University; "Electroplating and the Uses of Copper in Machinery," speaker to be announced later; "Heat Treatment of Gears," by W. H. Phillips, vice-president Molybdenum Corporation of America, Pittsburgh.

THURSDAY, JAN 15

10 a. m.—Pacific Coast Gas Association, C. M. Grow, new business manager Southern California Gas Co., chairman of program committee. Five paper scheduled:

"Gas and Electricity as Heat Mediums," by F. W. Manker, vice-president Surface combustion Co., Toledo, Ohio; "Heat-Treating Furnace Design," by J. H. Gumz, industrial engineer Pacific Gas & Electric Corporation, San Francisco; "Existing Heat-Treating Installations," by E. M. DeReamer, industrial engineer Southern California Gas Co., Los Angeles; "What the Gas Companies Are Doing For Industrial Heating," by C. M. Grow, new business manager Southern California Gas Co., Los Angeles; "Gas as Applied to Carburizing," by Robert G. Guthrie, metallurgist Peoples Gas Light & Coke Co., Chicago.

2 p. m.—Pacific Coast Electrical Association, R. C. McFadden, new business manager Southern California Edison Co., chairman. Four papers scheduled:

Address by Paul Downing, vice-president Pacific Gas & Electric Corporation, and president of the Pacific Coast Electrical Association; This session will be in the form of an illustrated symposium on "Electric Heat as Applied to Industry," by C. L. Ipsen, consulting and designing engineer of the industrial heating and welding department of the General Electric Co. Another paper has been prepared, by Gilbert D. Fish, of Westinghouse Electric & Mfg. Co., on "Design as Applied to Arc-Welded Construction."

FRIDAY, JAN. 18

10 a. m.—Society of Automotive Engineers, Ethelbert Favary, Moreland Motor Truck Co., chairman of program committee. Papers follow:

"Manufacture and Heat Treatment of Automobile Leaf Springs," by J. B. Rauen, general manager United States Spring Co., Los Angeles; "Production of Nickel Steel Castings by Electric Furnace Method," by E. Favary, consulting engineer Moreland Truck Co.; "Aluminum as Applied to the Automotive and Airplane Industry," by Dr. Zay Jeffries, chief research engineer, Aluminum Co. of America, Cleveland; "Some Phases of Aircraft Construction." Speaker to be announced. "Metallurgical and Heat-Treating Problems in Motor Car Manufacture (illustrated with moving pictures)," by J. M. Watson, chief metallurgist Hupp Motor Car Co.

2 p. m.—American Welding Society, A. E. DeBurn, Pacific Pipe & Supply Co., chairman of program committee.

"The Welding of Steel Buildings and Bridges," by Dr. Frank P. McKibbin, consulting engineer for the General Electric Co. (The American Society of Civil Engineers, the American Institute of Electrical Engineers and the American Institute of Architects will participate in this meeting.) "Heat Treatment with Oxy-Acetylene Flame," by J. J. Bruton, service engineer Oxweld-Acetylene Co., New York; "Building Machinery with Arc-Welded Steel Replacing Castings," by David Hall, district engineer Westinghouse Electric & Mfg. Co. of Los Angeles.

All morning sessions will be held at the Biltmore Hotel, and all afternoon sessions at the Shrine Auditorium.

Substitutes Used For Strategic Metals

War Department Finds That Ingredients Regarded as Essential in Case of War Can Be Provided By Other Elements

WASHINGTON, Dec. 11.—Work of the War Department in providing for adequate supplies of essential raw materials for use in possible hostilities was outlined to the annual convention of the American Mining Congress on Friday afternoon of last week by Assistant Secretary of War C. B. Robbins. The plans call for strict economy and curtailment or abolition of unnecessary uses of raw materials; ascertainment of materials of domestic origin which can be substituted for those minerals which are not in abundance in the United States; increasing domestic production; and procuring and storing in peace time an adequate supply to carry the country through an emergency.

Among minerals classed as strategic were tin, chromium, manganese, mercury, antimony, nickel and tungsten. Regarding antimony, Mr. Robbins said that there has been a reduction in military requirements for this metal by substitution of an alloy of lead with barium and calcium. Much work, he said, had been done looking to the provision of substitutes for tin in its manifold uses. By replacing bearing metals and solders containing tin with alloys containing little or no tin, he said, the department has been able to reduce its figures for direct military requirements of tin for two years from 20,000 to about 15,000 tons. It was stated that the work which is now in progress on food containers promises ultimately a much larger reduction.

"Until recently," said Mr. Robbins, "tungsten has been regarded as absolutely essential to the production of high-speed tool steel, but work which has been done by our molybdenum producers and at Watertown arsenal by our Ordnance Department leads us to hope that some day we may be able to eliminate practically all of our requirements for tungsten in tool steel. It is believed that when the technique of manufacture has been adequately worked out we shall be able to make perfectly satisfactory cutting tools of a molybdenum alloy to replace the present tungsten alloy. The molybdenum tool is fully as satisfactory as the tungsten tool. In fact, molybdenum tools that have been used in the shops at Watertown arsenal have been preferred by the workmen to the tungsten tools. We have, however, still to perfect a process which will assuredly make every molybdenum steel tool as satisfactory as every other molybdenum steel tool. If this substitution is made we can reduce our requirements for both direct and secondary uses by at least 40 per cent.

"With respect to nickel, it is interesting to note that while we formerly specified nickel steel for all artillery we now find that substitution can be made on nickel steel with satisfactory results, up to and including the 155-mm. gun. This, of course, effects some reduction in our requirements for nickel."

The convention adopted resolutions for continued tariff protection to the mineral industries, revision of the national tax laws to relieve the mining industry of burdensome taxes, and increased funds for mining investigations by the Federal and State Bureaus of Mines and Geological Surveys. S. L. Mather of Cleveland, vice-president of the Cleveland-Cliffs Iron Co., advocated removal of State and Federal inequalities in the iron ore mining industry. He discussed conditions in the industry in Minnesota, Michigan and Wisconsin.

The following officers were elected: President, Robert E. Tally, Clarkdale, Ariz., general manager United Verde Copper Co.; first vice-president, William H. Lindsey, Nashville, Tenn., president Napier Iron Works; second vice-president, Jesse G. McDonald, Leadville, Colo., president Downtown Mines Corporation, and former governor of Colorado; third vice-president, S. L. Mather, Cleveland, president Cleveland-Cliffs Iron Co.; secretary, J. F. Callbreath, Jr., Washington.

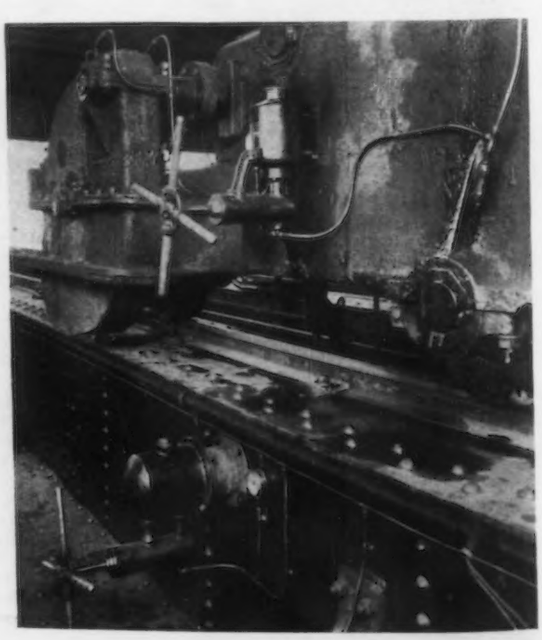
Centralized Lubricating System

Changes in details of the Farmer System of Lubrication, described at page 416 of our issue for Feb. 10, 1927, have permitted the system to distribute either oil or grease. A wide range in gun capacities is said to justify installation on small machine tools as well as on large ones, and to permit grouping of many machines on a single reservoir and gun. There has been a change in management accompanying the change in the system. The Farmer Lubricating System, Detroit, has been absorbed by Lubrication Devices, Inc., Battle Creek, Mich., and the name has been changed to Farval Centralized System of Lubrication; this name is part of a registered trademark.

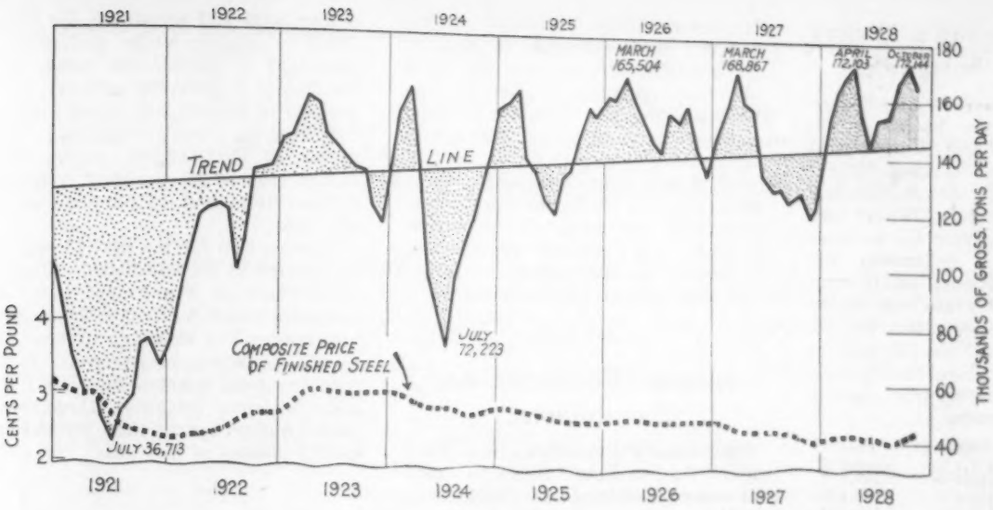
Positive measuring devices located at each bearing have been fitted with screens in the valve to keep foreign matter out. A glycerine fiber gasket forms a perfect seal when the system is idle and thus permits use of very light lubricant. With its positive measuring valve at each bearing, this system is said to put plant lubrication on a production basis. It becomes possible to lubricate completely an entire machine or group of machines from one central station. It provides great safety for the operator, reduces the labor of oiling and delivers at high pressure to each bearing the lubricant required.

Two units are shown installed on 50-ton overhead electric traveling crane of 80-ft. span. As will be seen, one gun is mounted on the trolley and the other on the bridge. Together they lubricate 43 points with grease. Some of the features of operation of this installation are as follows:

With the old grease-cups it took a man an hour to lubricate this crane and it usually was done on overtime. Complete lubrication is now accomplished in about 2 min., eliminating danger to the oiler. Lubricant consumption daily with the old method was 2½ lb. Under the present system it is ¼ lb. of grease a day. Economy in the labor of oiling is estimated at $300 a year.



Centralized Lubricating System on a Traveling Crane, Using One "Gun" on the Bridge and One on the Trolley. Tubes carry the grease, under controlled pressure, from the guns, to the many points of application



November Shows a Drop of 8½ Per Cent from the Record-Breaking Ingot Production of October, but It Was the Largest November Tonnage Ever Made. On the basis of daily averages the figures were high. Prices were fractionally better than at mid-year

Highest November Ingot Production

Steel Output Continues at Record-Breaking Rate—11-Month Total 5½ Per Cent Ahead of 1926 and 14 Per Cent Ahead of 1927

PRODUCTION last month of open-hearth and Bessemer steel ingots in the United States, as reported by the American Iron and Steel Institute, was the highest ever recorded for November. The calculated output, at 4,259,380 gross tons, displaced the previous November high of 3,902,900 tons, which was recorded in 1925. The figure compares with 3,127,015 tons a year ago, and with the record-breaking total of 4,647,891 tons in October, which had 27 working days against 26 in November.

Eight months of the 11 so far this year have shown calculated outputs of more than 4,000,000 tons in each instance. Never before has any year contained more than four 4,000,000-ton months; 1926 had four, while 1927 had three such months and 1925 and 1923 each two.

For the 11 elapsed months of the year, calculated production has reached 45,837,791 tons. This is the largest amount for the first 11 months of any year and exceeds the 12-month figures of all previous years except 1926. The largest previous total for 11 months was in 1926, with 43,469,439 tons. Thus the present year is 5.4 per cent higher than the previous record. (Inasmuch as the earlier figure included both crucible and electric steel ingots, which are no longer reported by the institute, the actual gain is considerably higher than that indicated above.) Compared with last year, there is an increase of more than 5,600,000 tons, or 14 per cent. In fact, the 11 months have exceeded the entire 12 months of 1927 by more than 2,400,000 tons.

Compared with October, November showed a falling off in open-hearth steel of nearly 10 per cent. As to Bessemer steel, however, the drop was only 1¼ per cent. When comparison is made with last year, however, it is the open-hearth that has shown the greatest gain. The increase in 11 months has been more than 15 per cent, against about 7 per cent for Bessemer steel. October made a new record in open-hearth steel, as well as in total ingots.

On the daily basis, November showed an average of 163,822 tons for each of the 26 working days. This compares with 172,144 tons, the new record established in October. It compares also, however, with only 120,270 tons in November, 1927. Allowances for crucible and electric steel ingots would increase the November figure to nearly 165,000 tons a day. Details of the first 11 months of this year, with comparisons for last year, are covered in the table.

ELEVEN MONTHS' PRODUCTION OF STEEL INGOTS (GROSS TONS)

1927						1928				
Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies	Months	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
Open-Hearth	Bessemer					Open-Hearth	Bessemer			
3,042,133	545,596	3,789,874	26	145,764	January	3,280,247	498,746	3,991,332	26	153,513
3,043,492	565,226	3,812,046	24	158,835	February	3,308,728	521,366	4,045,304	25	161,812
3,702,660	590,709	4,535,272	27	167,973	March	3,700,411	567,309	4,507,520	27	166,945
3,341,750	565,440	4,127,335	26	158,744	April	3,509,637	564,039	4,302,573	25	172,103
3,273,593	557,785	4,047,251	26	155,663	May	3,397,631	581,949	4,203,190	27	155,674
2,823,107	486,053	3,495,609	26	134,446	June	3,016,487	527,351	3,742,964	26	143,960
2,596,349	436,883	3,204,135	25	128,165	July	3,075,247	533,550	3,811,573	25	152,463
2,806,347	505,596	3,498,549	27	129,576	August	3,386,750	569,436	4,178,481	27	154,759
2,622,977	471,548	3,268,881	26	125,726	September	3,381,917	545,015	4,147,583	25	165,903
2,643,562	495,845	3,316,292	26	127,550	October	3,802,396	598,227	4,647,891	27	172,144
2,478,627	481,599	3,127,015	26	120,270	November	3,441,985	590,796	4,259,380	26	163,822
32,374,597	5,702,280	40,222,259	285	141,131	11 Months	37,301,436	6,097,784	45,837,791	286	160,272

Steel Corporation's Orders Decline in November

For the first time since July the unfilled orders on the books of the United States Steel Corporation showed a decrease. On Nov. 30 the total was 3,673,000 tons, a decrease of 78,030 tons from the 3,751,030 tons on Oct. 31. In October the increase was 52,662 tons; in September, 74,325 tons, and in August, 53,116 tons, but in July the decrease was 66,082 tons. A year ago, on Nov. 30, the unfilled orders were 3,454,444 tons, or 218,556 less than on Nov. 30 this year. The table gives the reported figures for the last 23 months.

	1928	1927
Jan. 31	4,275,947	3,800,177
Feb. 28	4,398,189	3,597,119
March 31	4,335,206	3,553,140
April 30	3,872,133	3,456,132
May 31	3,416,822	3,050,941
June 30	3,637,009	3,053,246
July 31	3,570,927	3,142,014
Aug. 31	3,624,043	3,196,037
Sept. 30	3,698,368	3,148,113
Oct. 31	3,751,030	3,341,040
Nov. 30	3,673,000	3,454,444
Dec. 31	.....	3,972,874

At the end of April, 1917, the highest total in unfilled orders of the Steel Corporation ever attained was reported, at 12,183,193 tons. The lowest figure ever reported was 2,754,757 tons, Dec. 31, 1910.

Record Earnings for Labor in New York State Plants

Average weekly earnings of employees in representative New York State factories in October are reported by the State Industrial Commissioner at $29.78, equalling the record made in March of last year. The gain over September was 6c., while there was an increase of 50c. compared with October, 1927. Only in April was the average in any month this year below $29. Last year, July and November were below that figure.

There has been a gradual increase since 1922 in the yearly averages. In 1923 this was $27.24. It reached $27.68 in 1924, $28.26 in 1925, $29.02 in 1926, $29.30 in 1927, and $29.35 in the first 10 months of 1928. All of these figures subsequent to 1924 have exceeded the average of $28.15 recorded in 1920, the year of inflation.

Makes Industrial Use of Talking Movie

First to use the talking motion pictures for an industrial or advertising purpose, the Graham-Paige Co., Detroit, has adopted the "Talkie" to deliver a message to its dealers throughout the country, urging them to attend the Graham-Paige dealers' convention in Detroit, Jan. 3 and 4, just prior to the New York automobile show. A satisfactory demonstration of this new use of the talking films was made in Washington, in early December, before a group of 50 Graham-Paige dealers, guests of the company at a luncheon in the Mayflower Hotel. Included in the film are short addresses by each of the three Graham brothers, making it the first opportunity the Graham Brothers have had to deliver personal messages to their dealers throughout the country.

A portable apparatus has been constructed in which the complete reproducing and projecting machines, together with films and loud speaker, are packed in three trunks no larger than the average wardrobe trunk.

Newark Foundries Are Consolidated

Sacks-Barlow Foundries, Inc., Newark, N. J., has been formed to take over and consolidate Louis Sacks, Inc., 357 Wilson Avenue, and Barlow Foundry, Inc., 551 New Jersey Railroad Avenue, both specializing in gray iron castings. The new organization has acquired by purchase the property and business of the Morrison-Flockhart Foundry Corporation, 216 Rome Street, specializing in similar castings, and which will be consolidated with other interests. The Newark Malleable Iron Co., 357 Wilson Avenue, heretofore operated as a subsidiary of Louis Sacks, Inc., will be included in the merger, continuing in the production of malleable iron castings.

Walter Kidde is chairman of the board of the new organization; David L. Sacks, president; Samuel F. Dixon, vice-president; Arthur E. Barlow, treasurer.

Gray Iron Institute to Hold Local Meetings

The Gray Iron Institute will hold two meetings in eastern Pennsylvania this week, at which the purpose of the institute will be outlined to foundry executives in the respective localities. Thursday evening, Dec. 13, a meeting will be held at the rooms of the Manufacturers' Association, York, and the following evening there will be a meeting in the rooms of the Berks County Manufacturers' Association in Reading. The meetings will be attended by Arthur J. Tuscany, manager of the institute; Albert E. Walton, Eastern representative, and B. H. Johnson, Cresson-Morris Co., Philadelphia, who is vice-president of the institute.

Large Building Operations in November

Building contracts placed in November in the 37 States east of the Rocky Mountains are reported by F. W. Dodge Corporation at $471,482,000. This shows a gain of 1 per cent over November, 1927, but it is 21 per cent less than in October, 1928. Residential construction made up 42 per cent of the total and accounted for $200,226,000. Public works and utilities amounted to $93,228,000, commercial building to $68,309,000, and industrial projects to $38,665,000. New projects contemplated were reported last month at $931,114,000, representing an increase of 51 per cent over the October total and 13 per cent above last year.

Construction for the first 11 months is reported at $6,195,530,000. This is an increase of 6 per cent over the amount started in the first 11 months last year. The territory covered accounts for about 91 per cent of the country's total construction. Of the eight districts reviewed, three have shown higher figures than for the entire 12 months of last year.

Obituary

CHARLES E. PIERCE, for 27 years territorial manager in central New York State for the International Harvester Co., Chicago, died at Schenectady, N. Y., on Dec. 3, aged 56 years.

—

HENRY O. TAYLOR, founder and president of the Taylor-Tenoning Machine Co., Rockford, Ill., died on Nov. 28, aged 54 years. He was born in New York and had been a resident of Rockford for 35 years.

—

GEORGE WIEGAND, president Standard Stamping Co., St. Louis, died at St. Luke's Hospital in that city Dec. 8, aged 65 years. Since the death of his father in 1908, he had been head of the company. He learned the tinner's trade under his father and when 14 years old became a traveling salesman for the company. In later years his three sons, Porter, James and George G., went to work for the firm, and the former is now vice-president.

—

WILLIAM H. WASWEYLER, president Milwaukee Brass Mfg. Co., Milwaukee, died suddenly on Dec. 1, aged 64 years. He was graduated from the University of Wisconsin in 1885 and became president of the company in 1892.

—

EMIL SCHROEDTER, for many years associated with the editorial direction of *Stahl und Eisen* and also prominent in the activities of the Vereins deutscher Eisenhüttenleute (German Iron and Steel Institute), died Oct. 31 at Bonn, Germany. He was born Feb. 26, 1855, and was one of the most prominent men in the German steel industry. A four-page tribute to Mr. Schroedter, giving in detail a history of his life and emphasizing his work as head of the German steel institute, is contained in the Nov. 22 issue of *Stahl und Eisen*.

This Issue in Brief

You can lose money by making a fixture that saves as high as 90 per cent on a certain operation, if you use it infrequently. On the other hand, a fixture used regularly, which saves as little as 5 per cent, may be a profitable investment. Frequency of use, interest, depreciation and obsolescence are some of the factors to consider before fixture is made or purchased.—Page 1489.

* * *

When installing a wage incentive plan, do not put the burden of selling the plan up to the incentive engineer. This is a job for the management to perform, for any new method is resisted throughout a shop until it has proved beneficial.—Page 1495.

* * *

Safety work demands the support of company officers. Safety is not entirely mechanical. The human element looms large. Unless managers and men cooperate, the purpose of the best of safety devices may be defeated.—Page 1496.

* * *

Tougher manganese steel made from pure manganese. Manganese made by the vacuum distillation method, 99.99 per cent pure, produces a carbon-free manganese steel, which is practically independent of heat treatment.—Page 1499.

* * *

Smallest plants more efficient than largest plants in two-thirds of industries surveyed. Using as a measuring unit the value of product per 1000 factory man-hours, investigators find, in 53 industries surveyed, that the smallest plant in 35 industries showed a better performance than the largest. Range of efficiency within individual industries was wide. In foundries, for example, the range was from 16 to 1.—Page 1500.

* * *

Can castings be made satisfactorily from blast furnace metal? Yes, says engineer. Doubts that remelting in cupola purifies the metal. Sulphur content is lower and silicon is conserved when blast furnace hot metal is made directly into castings.—Page 1502.

Proposed mileage freight rates penalize steel mills located near their markets, and favor long-haul competitors, say steel makers in freight rate hearings.—Page 1509.

* * *

Need for collective bargaining by wage earners is suggested by interests of society, says Taylor Society head. And this implies, he adds, the organization of workers on a basis extensive enough to make bargaining power effective, to the end that the weaker side may be represented in negotiations as to hours, wages, status and working conditions.—Page 1511.

* * *

Cost-reducing equipment finds good market in Germany. Germans are particularly receptive to offers of any kind of machines that will further the mechanization of industry, provided German machines are not available. Thirty to 90 days' credit without interest is demanded.—Page 1546.

* * *

No business cycle theory is used in business forecast employed by telephone company. The most complete array of business and economic facts is obtained. Then these are interpreted by the use of past experience, economic factors and common sense.—Page 1487.

* * *

Low production cost per piece is not always lowest ultimate cost. Increasing the number of runs per year on a certain part will raise the cost per piece, but may be justified by balancing production costs and fixed charges on inventory.—Page 1491.

* * *

Have you adequate information about your market? Few businesses are so small that they cannot support at least one man to study markets. It is just as important to study the business which you are not getting out of a territory as the business you are getting, says engineer. Many manufacturers are content to base their methods upon opinion, rather than upon facts.—Page 1503.

Wasteful methods in shop are revealed by wage incentive plan. Cases in which men are standing idle for causes beyond their control, and where existing equipment is insufficient, are revealed by a well-designed wage incentive plan. Dragging inefficiencies into the light transforms an organization which is working in a habitual routine into a thinking organization.—Page 1496.

* * *

Instead of searching frantically for further markets for your product, give a thought to finding other products your plant is adapted to manufacture. Conditions have changed, says economist. Formerly the things which were produced were all the things there were to be sold. Now the things which can be sold are produced.—Page 1498.

* * *

How soon should new equipment pay for itself? General practice is two years, but this depends on conditions in individual industries. Where the rate of obsolescence is rapid the cost of the equipment should be extinguished in a shorter time. If the class of work is stable the new equipment may be a good investment if it pays for itself in six or seven years.—Page 1489.

* * *

Increase output 15 per cent by installing new lighting system costing 2 per cent of the payroll. Nine plants, most of them metal-working, cut costs by providing adequate lighting, and at the same time decreased accident liability.—Page 1488.

* * *

Stove pipe in the mold prevents splashing of nickel steel during pouring, and thereby improves the surface of ingot. The stove pipe catches the splash, and melts quickly in the rising metal.—Page 1492.

* * *

How greatly will machine shops be affected by the new carbide cutting tools? One machine tool builder believes that the high speeds available with carbide tools are useful only to firms having acute problems of mass production.—Page 1494.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Unweighed Iron Exports Large

WHAT are called our "iron and steel exports" are regularly reported in gross tons, the statistics being familiar to all. The figures through October were given in THE IRON AGE of Nov. 29, October totaling 256,870 gross tons and the ten months of this year 2,384,301 tons. A continuance of the October rate for the last two months of the year would make a 1928 total of about 2,900,000 tons, by a margin of about 700,000 tons the largest since 1920.

The common reaction to such a showing is one of gratification. We are doing quite a business. We are, however, doing a much more important business for which weight statistics are not reported. The other merchandise exports of the United States this year actually contain in the neighborhood of one million gross tons of iron or steel. We name these figures after a careful study of the entire statement of merchandise exports. The study involved much estimating, there being basis for close estimates in many cases, particularly those involving the larger quantities, while in others not much more than a careful guess could be made. But all the estimating was done in conservative mood, and an actual count, if it were possible, would be likely to show more than a million gross tons.

The merchandise runs from freight cars to pianos, from bath tubs to tin cans and tinware, from automobiles to canned goods, from agricultural implements to printing presses.

Naturally customers of the iron and steel industry, manufacturers, canners, etc., have the heavy end of the "value product" in our exports. Still, it can be said that the bulk of the material represents a greater value per pound as it leaves the steel mill to go to the exporting consumer than does the material which the iron and steel producers export direct.

Entirely apart from such considerations, something needs to be said in appreciation of the million tons of iron and steel contained in the merchandise exports and in depreciation of the 2,900,000 tons of "iron and steel" exports. The first depreciation of the latter is a glaring one, for there is included over half a million tons of scrap! Pig iron and iron castings account for nearly 150,000 tons, and there is a considerable tonnage of semi-finished steel. We shall have for the calendar year's exports of steel products, beyond the semi-finished steel and including steel manufactures reported by weight in the regular classification, about 2,100,000 tons.

To the million tons of iron and steel contained in the exported merchandise we need to make additions to get to the steel mill basis of quantity. Instead of deducting for scrap, as in the other exports, we must add for scrap made in manufacture, in the case of much of the tonnage, including steel used in producing automobiles, machinery, hardware, implements, etc. It is true of course that there is a considerable tonnage of iron castings.

Merely as a suggestion of the broadness of the field of these merchandise exports that contain iron and steel a few points may be mentioned. We export large quantities of oil in tin containers and over half a billion pounds of canned meat, fish, milk, vegetables and fruit. We export tinware, galvanized ware, enameled ware and sanitary ware. We export about half a billion dollars worth of electrical apparatus, machinery, office appliances and agricultural implements. Complete trucks and passenger automobiles run about 500,000 in number and car and truck engines about 150,000, other parts for assembly running in value over $60,000,000, and parts for replacement fully $50,000,000.

Steady Spending

THAT business has held so straight a course in recent years has been the puzzle if not the despair of forecasters. Trade simply has refused to indulge in the marked swings of former times. Only occasionally, quite too rarely, is it suggested that not enough attention is given to the human factor. We can find much explanatory material by gaging that factor, and thus it may be possible to work out something for the future.

Human nature may not change but styles do change. When in Rome, do as the Romans do. In that case one has moved into a new environment. But if the new environment comes and surrounds him it amounts to the same thing as to his conduct. The war produced tremendous changes in philosophies of life and other great changes have come since.

Steady spending has resulted. In the old days spending ran above the mean by spells and below it in intermediate spells. At one time there was "confidence" and at another time lack of confidence. Clearly it is an improvement to get away from these alternations, which were hard upon everybody except successful speculators.

The spending has been reasonably judicious. Manufacturers have been making large expenditures for new plants or for improvement in equipment of existing plants; but the object has been reduction in cost, which is always sound economics, rather than mere increase in capacity, which was sometimes unwise, freezing capital which it took years to thaw out.

There has been a great deal of building. When one recalls that two or three years ago there were warnings that in some sections at least building had been overdone, and yet the building has continued, there must

be doubt whether we shall overbuild. At the most the main result would be the depreciation of old structures that ought to have paid for themselves long ago. Such improvements are made that the newest buildings can never be in destructive competition with each other, whether they are hotels, office buildings, apartments or private dwellings.

Then we have to consider individual expenditures. It is several years now since instalment buying became a large factor in consumer merchandising. Thus far alarmist prophecies have not been borne out. Numerous cycles of these time payments have been completed and the business goes right along. In automobile buying the thing is so well established that the trade has annual statistics and can compare the percentage of "repossessions" in one year with the percentage of the preceding year. Perhaps the constant warnings against the abuse of the system have been a helpful check, as has the increasing amount of its retail purchases for which the public must pay cash, as chain store trade increases.

Somewhat puzzling is the relation of the stock market to this matter of spending. Are people putting incomes into it or taking them out? By precise arithmetical procedure it might be shown that everything balances, dollar by dollar; but we are looking at it from the human viewpoint—how individuals are affected in their conduct. If there is much spending due to speculative profits, that spending is going to stop some time. If people are putting in much surplus income, then in future they may spend corresponding money on goods or services and increase the general volume of business.

Were it not for the stock market and some things associated with it there would be a fairly clear picture of things running along at an even pace, menaced by little outside of pure accident, particularly destruction by war or nature.

Machining Manganese Steels

AN interesting piece of recent news concerns some machining experiments on Hadfield's cast manganese steel—that superlatively tough substance used for railroad frogs, steam shovel teeth and rock crusher jaws. To those who have battered away unsuccessfully at a thin fin with a cold chisel and hammer, it seemed almost a contradiction of terms to speak of machining such castings. Besides, the utility of such a development promised to be slight. Interesting, if true. If true, what of it? Who wants to machine such an alloy? Its entire utility has been developed with "non-machinability" in mind—any cutting had been done either with the oxy-acetylene flame or with a grinding wheel. The prime effort on the part of designer and foundryman is to make castings which do not require any such finishing.

Taking a broader view of the matter, however, it would appear that a considerable expansion in the use of high-manganese steel in rolled shapes or plates could be developed if they could be machined. For instance, cement mixer shells of rolled manganese steel plate should prove very successful where linings would be too bulky and heavy. Many types of battering tools, burglar proof devices, safes, armored car bodies, could use the alloy in forgings, bars or thin plate if they could be fabricated in the conventional way.

Again, we have recently discovered that the high-chromium nickel steels are excellent to resist corrosion and scaling at high temperatures, and a large potential demand has appeared from the chemical industry. These steels are similar to high-manganese steel in that their microstructure is austenitic—all the alloying elements are in solid solution. It would seem that the problem of fabricating these new steels into equipment for high temperatures and pressures would depend very much upon the ability to shear, mill, drill, and otherwise manipulate them in the machine shop.

Thus it is already necessary to cut austenitic steels. Of course, some of these corrosion resistant steels are permanently austenitic in microstructure and consequently do not present the extreme difficulties of high-manganese steel (which, as is well known, changes locally by the cold work of a battering and cutting tool into martensite, the hardest of structures). But experience shows that many of them are so tough they machine with difficulty, even though not very hard as measured by conventional methods. In this they resemble some of the complex bronzes.

Consequently it is well that a considerable body of information is now available about how to cut austenitic manganese steel. High-speed steels containing several per cent of cobalt are the ones which have been able to turn the trick. It is necessary to use machines with an excess of power, rugged tools made with low clearances and rakes, chucked up short to eliminate chatter and vibration. Coolant is undesirable, and the chip comes off in a long curly ribbon so hot a cigarette can easily be lighted with it.

Observation of the action suggests that the frictional heat developed by the tool nose is so great that the metal being cut is heat treated just under the cut. Pressure against the manganese steel induces the austenite to martensite reaction which stops ordinary cutting; but if the local heat is more intense, the spot being cut would be tempered into the less resistant troostite. This reaction takes place readily in manganese steel; in fact, one manufacturer of plate containing 13 per cent manganese and 1.2 per cent carbon finds it to be machinable with great difficulty immediately after quenching from 1850 deg. Fahr. The Brinell hardness is only 170 and the microstructure is wholly martensitic. After drawing this quenched material for 16 hr. at 1050 deg. Fahr., the structure is mostly troostite, the Brinell hardness has increased to 387 but the machinability is improved at least four-fold. Requenching after machining restores the austenitic structure desired for wear resistance.

As remarked above, cobalt seems to be the element which imparts the additional red-hardness to the cutting edge sufficient to maintain its strength at frictional temperatures high enough to temper the work. Experiments seem to show that the low-tungsten high-vanadium steel plus cobalt (W 14 per cent, Cr 4, V 2¼, Co 4½) is the best for roughing cuts. The high-tungsten low-vanadium steel (W 18 per cent, Cr 4, V 1) plus cobalt is better for the lighter, finishing cuts.

Opinions vary as to whether 5 per cent cobalt is sufficient for the latter type of steels; at least one American and one English maker recommend a steel with tungsten up to 22 per cent and cobalt up to 12 per cent. Heat treatment standardized for high-speed steels is satisfactory, i.e., quench in oil from 2400 deg. Fahr., and draw at 1050. Somewhat better results

may be had from tools taking the first or roughing cut by drawing only to 600 deg. Fahr. This gives the maximum toughness for the body of the tool to resist the shocks; the cutting edge is rapidly heated to 1050 or 1150 deg. Fahr. by friction, and immediately develops the maximum secondary hardness at the point where it is most needed.

In this practice, where the heat developed by the tool is necessary not only to soften the work but to harden the cutting edge, use of any coolant would obviously impede the desired changes. Whether cutting fluids will be of advantage on the permanently austenitic steels is a question to be answered by future trials.

How to Ruin a Meeting

ONE does not need to attend many sessions of engineering or technical societies before he will overhear an older habitue pine for the meetings of yesteryear, when the formally scheduled paper was merely the signal for animated discussion from the floor, often taxing the chairman's ability to control. Such meetings are disparagingly compared with the present day American standard; then, it is averred, the real meat of the proposition was discovered in the extemporaneous talk; now, it is sure, the audience sits meekly, saying nothing, listening as a crowd of students, too modest to criticize their professor or loath to demonstrate that he does not know it all.

It is sure that this deadly dullness has been observed by the program committees. It is militating against the success of the societies. So they make every effort to provide some discussion beforehand—copies of the address are mailed to experts far and near, imploring them to read it and send comment. But then these fore-handed committees do this strange thing: they give such written comment right of way, instead of holding it as an "ace in the hole," to keep the meeting alive in case no other remarks are made by those present.

The easily imagined result of such practice was observed last week at one of the mechanical engineers' meetings, and also last month at the steel treaters': A crowded program of four or five papers started with one of real interest to those present. After the author presented his subject, several members in the audience manifested a desire to comment or to ask a question. But no! Rules are rules. Afloat, women and children first; ashore, written discussion, first. So the available time was used up by reading (in the well-known vivacious manner) of page after page of comment. But even this could not dampen the ardor of those present who really wanted to start something. It remained only for the chairman to announce in a judicious manner that, since the available time for the first paper was exhausted, oral comment must be reserved until the close of the meeting.

Need it be remarked that the endurance of the audience was long passed by the time the *written* discussion on the last paper was completed, and those interested in the first had straggled out to lunch, for a walk in the fresh air, or for informal discussion in the lobbies?

SPECIALIZATION in training was urged 30 years ago by the makers of technical school curricula. Graduates were turned loose upon industry who gloried in having prepared themselves in a single branch of engineering. Their deficiencies in cultural education often became glaringly evident, the most common lack being in the use of the King's English. Much has been done to change all this and that much more remains to be done is being recognized at a gratifying rate. The new president of Stevens Institute, Dr. Harvey Nathaniel Davis, has put himself among the leaders of the advance in advocating "one fundamental unspecialized curriculum in engineering," in which studies in literature, history, economics, civil government, philosophy and art would have a larger place than heretofore has been thought needful in the making of a Stevens engineer. It is cheering to know that particular attention will be given to developing expression—an art in which the average graduate of our technical institutions has been all too backward.

CORRESPONDENCE

Making Open-Hearth Bottoms

To the Editor—It might interest your readers to know how the writer makes bottom in 50 and 75-ton basic open-hearth furnaces. When we construct a furnace and put it in operation, we proceed in making the bottom and side walls as follows:

First we take steel turnings, low in phosphorus and sulphur, put them on a pile and set them on fire. As a rule turnings carry from 150 to 200 lb. of oil to a ton, which is enough to burn them to synthetic iron. In large quantities of turnings one may find solid pieces of almost pure iron at the bottom of the pile after burning, which can be thrown into the furnace to improve the heats. After the turnings are burned, we throw them into the mill and grind them into a powder, and proceed as follows:

We take eight parts of American or Austrian magnesite, one part of burned, powdered steel turnings and one part of good basic slag, put this in the mill and thoroughly mix it. Meantime we get the furnace hot enough to set it up, and make bottom and side walls. We are careful not to use more at a time than the heat of the furnace will set up clear through.

We have found no trouble in making three 50-ton heats in 24 hr., averaging 25 gal. of 14-16 gravity oil to the ton of steel in the ladle. We use Wills fuel oil burners, which can be set to throw the hot-spot in the flame to any point in the furnace. We find that we can do away with the old type of reversing furnace, by keeping our ingoing air at the same temperature. The furnaces work more evenly, with less time to the heat and better control.

E. COOPER WILLS
President Wills Engineering Co.
78 Jacoby Street, Maplewood, N. J., Dec. 7.

Good Welded Joints

To the Editor: Your editorial in the issue of Dec. 6, entitled "What Makes a Good Joint," clearly points out that production control is necessary for satisfactory results. I would like to carry this thought a step further to emphasize the fact that welders who are on production, i.e., doing repetitive work, are much more easily and quickly trained than though they were to handle a variety of occasional repairs.

The situation is paralleled by machine work. Back in

the days before Henry Ford had made his first million (cars or dollars) a workman was not considered a machinist until he had served a long and comprehensive apprenticeship. Then came mass production and with it division of labor and specialization. Today it has reached the point well typified in the familiar anecdote of the father who expressed pride in his son's advancement in one of the large automobile plants. "Why," he told a friend, "Jimmy used to tighten nut 42 but now he tightens nut 187!" Those who admire craftsmanship lament the passing of the old order but the fact remains nevertheless that the new system is, and will continue to be, an important factor of industrial life.

Welding now is experiencing an exactly parallel transition. It is a change that should be welcomed rather than deplored, for it means that welding is accepted as a mass production tool. When welding was merely a method of repair, it was necessary for a man to gain long experience on a wide variety of metals and types of work before he could be considered qualified as a welder. That is, he had to learn a trade.

When considering welding as a production method many manufacturers fail to realize these facts. They immediately raise the objection "Where can we get welders?" The answer is shown by experience: Operators can be trained for repetitive work in a fraction of the time necessary to develop an all-round welder. In fact, several years' experience in the production of oxwelded pressure vessels has shown that green men are to be preferred, for they can be trained from the start in the procedure that has been determined to be correct for this work and it is not necessary for them to "unlearn" anything. A second striking instance of this proposition is described on page 1293 of your issue for Nov. 22, showing how Servel, Inc., was able to train over a hundred men and girls to make welds in steel tubing for domestic refrigerators that passed a pressure test of 900 lb. per sq. in.

The welding of piping, rapidly becoming so important in the heating and plumbing field, is another operation that can be taught with entire satisfacton in a relatively short time. The degree of training and skill necessary naturally increases for higher steam pressures but in no case does the time of training impose a handicap on obtaining efficient operators from average labor.

The problem of obtaining welders for production work is thus relatively simple and a realization of this should lead to an ever increasing number of manufacturers to adopt this modern method of joining metals.

A. G. Wikoff.
New York — Linde Air Products Co.

Research Is First Need in Marketing

(*Concluded from page* 1503)

tific management in production would have been long delayed if it had not been for the invaluable assistance of cost accounting. Few businesses do not now have a problem of hastening the development of cost accounting in marketing so that it may proceed with its major problem of marketing control.

More Flexible Budgets Needed

Based on past results many companies have decided to spend 10 per cent on selling and 3 per cent on advertising and the budget is the apportioning of the lump sums thus arrived at to various classes of expense. This might be called the restrictive budget. Good commercial research would bring out definite objectives for a sales period or a campaign and would enable a definite written plan for the activities necessary to attain the objectives. This plan would call for certain assigned activities on the part of individuals which would create expenses. With this start a budget might be built up from study of these projected activities. This might be called a constructive budget. If the final budget called for more money than the executives were willing or able to appropriate, the initial plan would be modified. This would help decide what to omit from the complete structure and would make for better judgment than would have been possible without the complete plan first. Perhaps in many cases the advisability of making an investment in the manner described of setting the excess expense as a deferred charge to be amortized over a period of time might be considered.

Soon larger use of the flexible budget idea will be made, so that field executives can control the scope or character of activities on the basis of certain day by day figures while the activities are in progress. No amount of historical figures can match this method of keeping informed of the profit angle of the work being done.

Training and Compensating Salesmen

Most marketing managers will agree that new or junior salesmen need sales training, although relatively few actually carry out their belief. That the tried senior salesman also needs training is recognized as a problem by few. As a road gets older, ruts appear and it must be scraped and rolled and re-surfaced if it is to be kept in good condition. Ruts appear as men grow older and they are prone to consider their education as finished. In successful lives, training never ceases, and more marketing managers should put training into their schedule of operations.

Many methods have been tried and many found wanting in the human problem of proper compensation. Compensation should not merely be payment for work done; it should also be stimulation to do the work yet undone. A solution may depend upon borrowing from production its knowledge and use of the task and bonus plan with its measurements and incentives.

Hoover's Final Report As Commerce Secretary

Some of the appendices contain much of the most interesting reading in the annual report of the Secretary of Commerce for the fiscal year ended June 30. An economic review showing volume of business quantities in manufacturing, minerals, forestry, building construction, electric power production, railroad traffic, etc., and value of sales in various types of wholesale and retail trade are given for a period of seven years in comparative figures. General wholesale price indexes, gross incomes of farms, banking and finance and foreign trade make up parts of the general review.

Following this are an article showing the general progress and tendencies in our foreign trade, another illustrating progress of national efficiency in output per worker, a third on elimination of waste, including the waste of human life or limb, an article on advance in standards of living, giving indicators of material progress at intervals since 1914, and one on commercial aeronautics. These add specific information on a number of significant topics connected with our national well-being.

Practically all of this type of information has been developed in usable form under the leadership of Hon. Herbert Hoover, who was Secretary of Commerce throughout the period surveyed. It is a brand of service not theretofore enjoyed by American business and one which has high possibilities for future expansion.

Iron and Steel Markets

Steel Output Holds at High Rate

Year-End Decline in Production Likely to Be Small—Active First Quarter in Sight—Scrap Rises—Wire Products Advanced

STEEL production is exceeding expectations as the year-end approaches, and the business outlook for the early part of 1929 is promising. Tapering specifications for some products, such as bars, shapes, sheets and strips, are offset, in part, by releases of rail and tin plate tonnage.

Ingot output at Chicago, as a result of greater pressure for rail shipments, has risen a number of points to 83 per cent of capacity, an average that is expected to hold for the rest of the year. Operations in the Greater Pittsburgh district, although likely to decline during the holiday season, have as yet shown no deviation from the 80 per cent rate of recent weeks. The average for Steel Corporation subsidiaries, at 83 per cent, is also unchanged.

Taking into account that these estimates usually err on the conservative side, as was the case in November, output for this month will probably set a new December record and it may prove surprisingly close to the November daily average.

The lack of price incentive, rather than any noticeable change in the volume of consumption, accounts for the decline in specifications and new business in some products. Apparently a tendency to buy at shorter range, together with heavy shipments, was an important factor contributing to the November decline of 78,000 tons in the Steel Corporation's unfilled orders—the first decrease since July. The total on Nov. 30, however, was 218,500 tons larger than on the same date one year previous.

Reduced specifying has occurred particularly in bars, plates and shapes. With no higher prices announced for first quarter, buyers see no reason for heavy last minute releases against current contracts, nor are they in haste to cover for the coming quarter.

In sheets, which have been advanced $2 a ton, a fair amount of forward contracting has been done, but specifying has been cautious. Failing to induce mills to delay shipments until January, many sheet buyers are waiting until the mid-month deadline, thus to prevent, if possible, pre-inventory deliveries.

In tin plate the technical position of the market has resulted in a sharp rise in production, operations now averaging 87 per cent, compared with 70 per cent a month ago. The announcement of a price of 10c. more a base box released liberal specifications for 1929, and brought in considerable spot business.

Railroad demand is also expanding. At Chicago, largely because of liberal rail and accessory bookings, sales in the past two weeks were equal to those for any 14-day period this year. New rail purchases include 88,000 tons for the Baltimore & Ohio and 50,000 tons for the Missouri Pacific. Specifications for steel required in cars recently purchased are beginning to reach the mills, and the outlook for further freight equipment buying has been brightened by fresh inquiries, among them 3000 cars for the Missouri Pacific, 1000 for the Lehigh Valley and 500 for the Chicago Great Western. Adding the pending equipment purchases of the Santa Fe, Louisville & Nashville and the Rock Island, more than 15,000 cars are now in the market.

Steel demand from the automobile industry promises to rebound sharply in January. Motor car builders, although at present curtailing operations as inventory-taking approaches, are planning large production schedules for the first quarter. Chicago reports that automobile parts makers are already taking larger quantities of steel.

A recovery of strength in scrap prices is also regarded as an augury of a more active steel market next year. Heavy melting steel at Pittsburgh has advanced 75c. a ton to $17.75, or within 25c. of its peak in October.

Prospective structural steel work is of growing proportions. Out of 58,000 tons added to pending projects this week, 34,000 tons is for New York subways and 10,000 tons for a Government building at Washington.

Farm implement plants continue to take more steel, although according to current estimates they have consumed 60 per cent more steel this year than in 1927.

A policy intended to protect the position of the jobber is seen in the announcement of an advance on wire products that introduces a new method of quoting. Under this plan, which applies to all items except woven wire fencing and wire rods, base prices will apply on shipments to retailers and consumers who buy in carload lots and jobbers will be given a preferential of $2 a ton. The method, similar to that used by makers of pipe and bolts, nuts and rivets, reverses the former practice of quoting base prices to jobbers and attempting to obtain an advance of $2 from other carload buyers. While the new quotations are $4 above previous base prices, they represent an increase of only $2 to jobbers.

Another price adjustment affects charcoal and lap-welded steel boiler tubes, which after Jan. 1 are to be sold on the basis of weights and price lists used by manufacturers of seamless boiler tubes. A new schedule of discounts has been published.

Ingot production in November, 4,259,380 tons, was the highest ever recorded for that month. Output for the 11 months was greater than for any previous 12 months except 1926.

THE IRON AGE composite price for finished steel has advanced from 2.362c. to 2.391c. a lb., the highest figure in 22 months. The pig iron composite remains at $18.59 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
No. 2, fdy., Philadelphia	$21.26	$21.26	$21.26	$19.76
No. 2, Valley furnace	18.00	18.00	17.50	17.25
No. 2, Southern, Cin'ti	20.19	20.19	19.94	19.69
No. 2, Birmingham	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	20.25	20.25	19.75	19.00
Basic, Valley furnace	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh	20.01	20.01	20.01	19.51
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	18.25	18.25	18.25	17.50
Gray forge, Pittsburgh	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	33.00	33.00	33.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	38.00
O.-h. billets, Phila.	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.80
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh	1.90	1.90	1.95	1.80
Steel bars, Chicago	2.00	2.00	2.00	1.90
Steel bars New York	2.24	2.24	2.29	2.14
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Chicago	2.00	2.00	2.00	1.90
Tank plates, New York	2.22½	2.22½	2.22½	2.12½
Beams, Pittsburgh	1.90	1.90	1.90	1.80
Beams, Chicago	2.00	2.00	2.00	1.90
Beams, New York	2.19½	2.19½	2.19½	2.09½
Steel hoops, Pittsburgh	2.10	2.10	2.20	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Dec. 11, 1928	Dec. 4, 1928	Nov. 13, 1928	Dec. 13, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh	3.60	3.50	3.50	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.70	3.60	3.60	3.70
Sheets, blue, 9 & 10, P'gh	2.10	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.10	2.10	2.15
Wire nails, Pittsburgh	2.65	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.70	2.60	2.60	2.55
Plain wire, Pittsburgh	2.50	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.45	2.45	2.45
Barbed wire, galv., P'gh	3.30	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.75	$17.00	$17.25	$15.00
Heavy melting steel, Phila.	15.00	15.00	15.50	13.50
Heavy melting steel, Ch'go	14.50	14.50	14.50	12.00
Carwheels, Chicago	14.25	14.25	14.25	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)	15.50	15.50	15.50	14.00
No. 1 RR. wrot., Phila.	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)	13.25	13.25	13.00	10.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.85	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	16.12½	16.12½	16.12½	14.25
Electrolytic copper, refinery	15.75	15.75	15.75	13.87½
Zinc, St. Louis	6.35	6.35	6.25	5.75
Zinc, New York	6.70	6.70	6.60	6.10
Lead, St. Louis	6.35	6.32½	6.20	6.32½
Lead, New York	6.50	6.50	6.35	6.50
Tin (Straits), New York	49.50	52.50	50.12½	58.50
Antimony (Asiatic), N. Y.	9.62½	10.00	10.37½	11.37½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Business Sufficient to Maintain 80 Per Cent Operation —Advance in Heavy Melting Steel

PITTSBURGH, Dec. 11.—Specifications against existing contracts for finished steel are still coming along in volume sufficient to sustain an ingot production of approximately 80 per cent of capacity for this and nearby districts. But in most products shipments on old commitments are exceeding fresh purchases and signs point strongly to some recession in plant engagement during the holiday season.

With specifications for early 1929 requirements and some prompt buying to escape the advance in prices that becomes effective on Jan. 1, tin plate mills are having an exceptionally high rate of operation. Independent capacity is fully 90 per cent engaged, and it is estimated that close to 87 per cent of all mills now are in production. Rail mills also are busier and taking more steel. On the other hand, scheduling of bar, sheet and strip mill operations is becoming a little more difficult with backlogs running down and fresh buying light.

First quarter contracting is proceeding with less speed than would probably be the case if materially higher prices were proposed in bars, plates, shapes and cold-finished steel bars. Fourth quarter prices are continued into the first quarter and therefore coverage merely becomes an extension of existing arrangements. There has been a fairly good amount of contracting for the next quarter in sheets, but in hot-rolled strips the report still is that several of the large buyers have yet to cover their needs for the period. It is said that buyers and sellers are apart on prices, with buyers resisting the demands of the mills.

Since a week ago, almost all producers of wire and wire products have adopted a new price schedule announced late last week by a large Pittsburgh manufacturer. This schedule sets up an advance of $2 a ton on all products except woven wire fence and wire rods on first quarter contracts. It also seeks to establish a new mode of quotation in that announced prices refer to carloads to other than jobbers.

Effective Jan. 1, makers of charcoal iron and lapwelded steel boiler tubes are adopting the weights and price lists used by manufacturers of seamless boiler tubes as the basis of a new list of discounts. On carload lots, lapwelded steel boiler tubes will be almost on the same basis as hot-rolled seamless tubes; the difference will be in the supplementary discount, which is 5 per cent on the latter and two fives on the lapwelded tubes.

Primary materials are featured by a sharp rally in the price of heavy melting steel scrap. At least two local melters have paid $18 for that grade, while even more was paid for offerings in a railroad list awarded late last week. Dealers with short orders to cover have become disturbed by the scantiness of offerings and the situation in the Youngstown and nearby districts has become very strong, since expected relief in large shipments from the Detroit district with the closing of Lake navigation has failed to materialize. Automo-

bile production declined with the ending of Lake shipping season and with it the production of scrap. Even higher prices are mentioned on first quarter tonnages.

Pig Iron.—The pig iron market, so far as the immediate Pittsburgh district is concerned, is dull and not very steady. Melters are drawing against supplies under contract, and the most active merchant furnaces are shipping more than they are producing, but new business, influenced by inventory considerations, runs chiefly to carload lots. The Westinghouse Electric & Mfg. Co., in the market for foundry, silvery and Bessemer irons for its requirements over the first half of next year, has not yet closed and is reported to have a lower price on the foundry iron than $18, Valley furnace, for the base grade. No great trouble is experienced in getting that price on small lots, and most of the current inquiries are of that character. A Pittsburgh district steel maker was able to place about 3000 tons of basic iron for December-January-February delivery at less than $17.50 at Valley furnace, but the deal is not believed to have involved any Valley iron. This grade, however, now is available from several sources at $17.50, Valley furnace, and a buyer of several weeks ago recently added to the original purchase at that price. Struthers furnace, Struthers, Ohio, will be started Dec. 12, after a long suspension.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.50
Bessemer	$18.25 to 18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.25 to 18.50
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Hot-Rolled Flats.—Buyers of strips are specifying steadily on old orders, but do not find it necessary to make new purchases. First quarter contracting has not assumed large proportions. Several of the large automobile manufacturers have yet to close for their first quarter needs, and producers report considerable resistance to price from that direction.

Cold-Rolled Strips.—There is a fairly heavy run of specifications on this quarter's contracts, also a fair amount of advance buying. Prices are holding well at 2.85c., base Pittsburgh or Cleveland, and an effort still is being made to obtain 2.95c., base, from buyers whose orders generally are for small lots and whose specifications are rather exacting.

Semi-Finished Steel.—Users have until the end of the month to enter specifications on fourth quarter contracts and this condition probably accounts for a paucity of contracts for the first quarter. January requirements can be specified from this quarter's commitments. Sheet bars are held $1 a ton higher for the next quarter than in this quarter, but no advance is sought on billets and slabs. Current specifications are steady, but the volume is somewhat less than it was recently, in keeping with the fact that the demand for the finished products is less urgent with the approach of the end of the year. An advance of $2 a ton on wire products on first quarter contracts does not include wire rods, which remain at $42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—In view of the fact that present contract prices of these products hold for the first quarter of 1929, it is not surprising that the market is rather quiet, both as to current and first quarter purchases. There is no price incentive for specification of unshipped fourth quarter tonnages, and business for the first quarter suffers somewhat from the fact that unspecified tonnages for this quarter will become part of first quarter contracts. Releasing of tonnages is well under the rate of October and November, but has not dipped as low as was expected, because there has been no accumulation of stocks in second hands and requirements as they develop quickly are reflected in demands upon the mills. It is said that the mills are meeting with some success in raising prices to the very large consumers of bars, and that 1.90c., base Pittsburgh, will be more truly a minimum in the new quarter than it has been in this quarter. It is probable that mills also will seek more money on specific structural steel jobs which usually are given preferential price treatment. Fabricated steel awards to shops in this district still are few, but inquiry is reported better.

Rails and Track Supplies.—Track accessories orders still lag behind those for standard-section rails. Old orders are pretty well worked out. Increased production of standard-section rails is immediately ahead, as most of the roads accept shipments during the winter to be able to take advantage of the first break in the weather in the spring. The list of spike makers in this and nearby districts has been considerably augmented in the past year, but prices hold despite the increased competition.

Wire Products.—One large producer, under date of Dec. 5, announced the withdrawal of all prices on plain wire, wire nails and other wire products except those on woven wire fence and on the same date announced its prices on first quarter contracts. The new schedule calls for an advance of $2 a ton over this quarter's prices and also marks a change in the mode of quotation in that the prices are to "carload buyers," instead of "to jobbers in car lots," as formerly. Several other manufacturers since have adopted the new schedule and plan of quotation. For several months the mills have had a nominal extra charge of $2 a ton on nails and wire to buyers other than jobbers, but it has not been uniformly or regularly exacted. This arrangement was intended to give the jobber, who buys to sell again, an advantage over retailer or consumer, and apparently it is now intended to give the plan full application in the first quarter. While the mills will continue to regard as entitled to direct mill service a few large users, it appears to be part of the plan to divert smaller business to the jobbers by quoting as high a price on carloads to retailers and small consum-

THE IRON AGE Composite Prices

Finished Steel

Dec. 11, 1928, 2.391c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.307c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Dec. 11, 1928, $18.59 a Gross Ton

One week ago	$18.59
One month ago	18.50
One year ago	17.54
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$18.59,	Nov. 27;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.29c. to 2.34c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c. to 2.10c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.85c. to 1.95c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.15c. to 2.25c.
F.o.b. Coatesville	2.05c. to 2.15c.
F.o.b. Sparrows Point	2.05c. to 2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York	2.22½c. to 2.32½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.11c. to 2.21c.
Del'd New York	2.19½c. to 2.29½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
6 in. and narrower, P'gh	1.90c. to 2.00c.
Wider than 6 in., P'gh	1.80c. to 1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.85c.
Strips, Cleveland	2.85c. to 2.95c.
Strips, del'd Chicago	3.15c. to 3.25c.
Strips, Worcester	3.00c.
Fender stock, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, W. Va., or Reading, Pa.	$2.75
Less carloads, Wheeling or Reading	2.85

Woven Wire Fence

	Base to Retailers per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.20c.
Nos. 9 and 10, del'd Cleveland	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Cleveland	2.94c. to 3.04c.
No. 24, del'd Philadelphia	3.17c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade	4.00c.
No. 24, f.o.b. P'gh, No. 2 grade	3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(1¼% Nickel)	$0.25	$3.00
2100	(1½% Nickel)	0.55	3.30
2300	(3½% Nickel)	1.50	4.25
2500	(5% Nickel)	2.25	5.00
3100	Nickel Chromium	0.55	3.30
3200	Nickel Chromium	1.35	4.10
3300	Nickel Chromium	3.80	6.55
3400	Nickel Chromium	3.20	5.95
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100	Chromium Spring Steel	0.20	2.95
6100	Chromium Vanadium Bars	1.20	3.95
6100	Chromium Vanadium Spring Steel	0.95	3.70
9250	Silicon Manganese Spring Steel (flats)	0.25	3.00
	Rounds and squares	0.50	3.25
	Chromium Nickel Vanadium	1.50	4.25
	Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 4½ in.	46	3¼ to 4½ in.	— 9
5 to 6 in.	40		

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		Charcoal Iron
Under 5000 lb.	4 Fives	1 Ten
5000 lb. to 12,000 lb.	5 Fives	2 Tens
12,000 lb. to 21,000 lb.	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2½ in.	54	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3½ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ers as would be quoted by jobbers. The new prices "to carload buyers" are $2.75, base, per keg, Pittsburgh, for bright nails; $2.75, base, per 100 lb. for coated nails; $2.60, base, per 100 lb. for bright wire, and corresponding prices for galvanized wire, barbed wire and staples, with the former differentials retained as to other basing points. These prices are $2 a ton above what would have been obtained on the basis of former jobbers' carload prices plus the extra of 10c. per 100 lb. No reference is made to jobbers' carload prices, but it is assumed they will take a range 10c. per 100 lb. below the new schedule, or $2.65, base, per keg, for nails and $2.50, base, per 100 lb. for plain wire. The less-than-carload extra charge remains as formerly at 25c. per 100 lb. over the carload price.

Tubular Goods.—The demand for pipe is steady rather than active. In a general operation of not more than 70 per cent of capacity, the best showing is among the large lapwelding furnaces, which have a good complement of line pipe, and in seamless mills, which reflect the fact that much of the oil country pipe now called for is for deep wells and pipe of great ruggedness is required. Buttwelded pipe reflects in demand the fact that this is the low point of the year in building and construction and also that jobbers do not want to add to their inventories just now. Makers of charcoal iron and lapwelded steel boiler tubes are to put into effect a new method of quotation, which is given in detail elsewhere.

Sheets.—The market now appears fully established at the first quarter prices announced several weeks ago. Except possibly on blue annealed sheets, neither orders nor specifications can now be taken for shipment between now and the end of the month, and the mills are quite generally imposing the first quarter prices on shipments to be made next month. Users of automobile body sheets still are trying to get the mills to defer shipments on remaining fourth quarter tonnages beyond the year-end inventory date, and some of the same tendency is noted among consumers of other kinds of sheets, but commonly the mills are insisting upon shipment with the completion of orders and for specifications by Dec. 10 by one company and Dec. 15 by others on remaining fourth quarter contract tonnages. Shipments of the American Sheet & Tin Plate Co. this year will be the largest, with one exception, in the history of the company. Its combined sheet and tin plate shipments will set an entirely new high record.

Tin Plate.—Mill operations still are rising, notably those of the independent makers, two of which are running all of their mills, while another will next Monday put on a 12-mill unit, which has been idle for the past two months or so. Early 1929 requirements are being specified freely and there is some buying for early shipment by consumers who want to avoid the higher prices applying on first quarter and half contracts. This year will run in shipments well ahead of last year, but will not quite reach the total for 1926.

Cold-Finished Steel Bars and Shafting.—While some makers had somewhat heavier releases against contracts in the past week as compared with the previous week, the market still is best described as moderately active. Getting buyers under contract for the first quarter is not proving difficult; the fact that the prices remain unchanged means that not much price resistance is developing and there will be some unspecified fourth quarter tonnage to carry over.

Coke and Coal.—Spot furnace coke is commonly selling at $2.75 per net ton, Connellsville ovens, and while occasional small-lot sales occur at a slight advance, the coke is not for blast furnace use. Producers are scaling production in keeping with the fact that demand is light; in view of the taking up of the excess production through resumptions by two or three blast furnaces between now and end of the month, it is believed a stronger spot situation is ahead. There is much first quarter and first half contracting in foundry coke at unchanged prices. The spot foundry coke market is amply supplied, however, and prices are no more than steady. The coal market is so weak that a number of mines have been obliged to suspend production because of the losses which present selling prices entail.

Old Material.—The market has developed renewed strength in heavy melting steel in the past week. Light offerings of this grade have made dealers with short orders to cover a little nervous, and on top of that came the award of a railroad list; the heavy melting steel and scrap rails were sold direct to a mill at $17.50, while another railroad list developed a price of $18.25, delivered this district, for the heavy melting steel. The market appears in one week to have regained much of its decline of the previous month or so. Still higher prices seem probable, as in addition to dealer interest in supplies, several steel manufacturers are negotiating for first quarter coverage. Dealers seem indisposed to sell for that delivery at less than $18, delivered this district, while in Youngstown the asking price is $19. Machine shop turnings have had a sharp advance since last report, sales being reported up to $13, although the purchaser immediately after buying imposed a suspension upon shipments, and there is doubt that this price could be repeated. The low side of the range on heavy melting steel is $17.25, which dealers are paying for small lots.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$17.25 to $18.25
Scrap rails	17.50 to 18.00
Compressed sheet steel	17.50 to 18.00
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	17.25 to 18.25
Hvy. steel axle turnings	15.00 to 15.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	18.50 to 19.00
Railr. coil and leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	19.00 to 19.50
Low phos., light grade	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	20.00 to 21.00
No. 1 railroad wrought	13.00 to 13.50
Sheet bar crops	17.25 to 18.25
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	17.50 to 18.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Detroit Scrap Market is Slightly Weaker

DETROIT, Dec. 11.—Prices on old material in the district have not changed in the past week, and, while there is some tendency toward a slight weakness in the market, this has not materialized to affect prices downward.

Shipments of pig iron are somewhat below November figures, but not to the extent that furnaces serving the district will be forced to pile iron during the month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.00 to $13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00 to $34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	$33.00 to 34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%	35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.40 to $12.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t, square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Mill Output Gains to 83 Per Cent and Orders Assure This Operation for Remainder of Year

CHICAGO, Dec. 11.—The Inland Steel Co. has blown in its No. 1 blast furnace, bringing the total number of steel mill stacks in active service to 24 out of 36 in the district. In October and November 23 were in blast. A merchant furnace at St. Louis also has been lighted. That pig iron capacity in the Chicago district is not now considered excessive is indicated by contemplated new construction, which includes two steel mill stacks and the rebuilding to larger capacity of a local merchant furnace.

Releases against steel contracts are in such volume that the present rate of ingot output seems assured for the remainder of the year. With production at 83 per cent, a gain of several points in the week because of heavier demands for prompt delivery of standard-section rails, sellers are slowly using up cold iron.

Total tonnage of ore, limestone and coal passed over Chicago steel mill docks in 1928 will establish a record for all time.

Following the lead by producers east of here, Chicago mills have named 2c. to 2.10c. per lb. for plates, shapes and bars to be delivered in the first quarter. Inquiry is brisk, which is taken by the trade as a reflection of consumers' estimate of general business in the early part of the new year.

Sales, including rails and track accessories, are a trifle larger than in the previous week, making the past two weeks the equal of any 14-day period this year.

Automobile parts manufacturers are setting a faster pace, and the steel industry already is feeling the impulse of the greater activity. Automobile building usually lags about 30 days behind the first improvement in specifications and orders from parts makers. Automobile frame makers are taking larger quantities of hot-rolled strip.

Pig Iron.—The Chicago market remains steady at $20, notwithstanding that sales of boat iron and off grades from steel mills are reported at lower quotations. Sales, as gaged by recent weeks, are light, partly because of the lower foundry melt usually experienced during the holiday season and also because of the fact that most consumers are well covered for the remainder of the year. Malleable foundries are operating at close to capacity and occasionally find need of small additional purchases to meet immediate requirements. On the whole, the local foundry melt is well sustained. Silvery prices are not stable. Some producers recently named advances of $1 a ton, while others asked increases of $2. In the week sales have been made at prices prevailing before the advances.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$22.51 to 23.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet from the standpoint of sales. Shipments are going forward at an undiminished rate.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Coke.—Forward contracting for the first half of the new year is practically completed at $8 a ton, local ovens. Shipments remain at the high rate reached earlier this month.

Bolts, Nuts and Rivets.—Inventory taking has further reduced the total volume of specifications. Producers continue to hold to 65 per cent of output, and are stocking the margin between production and shipments.

Wire Products.—Western producers of these commodities are announcing advances of $2 a ton, effective immediately. The usual differential of 25c. per 100 lb. for less than carload quantities will be continued, and terms are 2 per cent for cash in 10 days on mill invoice value of material. In naming new prices the leading producer is using dealers' quotations at $2.80 for nails and $2.65 per 100 lb., Chicago, for plain wire. The general practice of the trade, however, is to name carload prices to jobbers at $2.75 for nails and $2.55 for plain wire, representing a $2 advance over recent quotations to the jobbing trade. Shipments from Western wire mills are steady, and output is close to 65 per cent of capacity. Little effort is being put forth by sellers to accumulate stocks. Inquiry from the manufacturing trade is more active, especially from automobile parts makers which are anticipating a rise in demand for their products soon after the turn of the year. Specifications are lighter from some sources because of the inventory period. The jobbing trade is unchanged except in the Northwest, where business slows down as severe winter weather approaches. Prices for wire and wire products are given on page 1527.

Sheets.—Prices are stronger. Local producers are accepting first quarter contracts at 2.25c. per lb., Chicago, for blue annealed sheets, 3c. for black and 3.75c. for galvanized. Forward contracting is more active, but users are conservative and the full swing of a buying movement has not yet been felt by producers. Specifications in the first 10 days in December are measurably ahead of the corresponding period in the preceding month. Releases against old orders are coming from a wide circle of users, but individually they are smaller than a week ago. Output is steady at 80 per cent of capacity, and deliveries are from three to four weeks on galvanized, two to three weeks on black and two weeks on blue annealed. Roofing sheets may be had promptly.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'l'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Hot-Rolled Strip. — Automobile parts makers are entering heavier specifications for material that will be needed soon after the turn of the year. Several local mills are operating at capacity. Prices are steady at 2c. per lb. for hot-rolled strip wider than 6 in.

Cast Iron Pipe.—Winter buying is gaining momentum. Milwaukee will close Dec. 28 on 9000 tons of 6 to 16-in. Class C pipe and 450 tons of fittings. Racine, Wis., is in the market for 1800 tons, and several other municipalities in Wisconsin will soon come into the market. A contractor's job in Cincinnati will take 300 tons of 6-in. pipe. Inquiries in Illinois, Indiana and Western Michigan are slow in developing. The United States Cast Iron Pipe & Foundry Co. bid $41.42 a ton, delivered, on 6000 tons of 24 to 48-in. pipe at Detroit. This figures back to $33.50 a ton, Birmingham. A foreign maker bid $39.90 a ton, delivered, on the 36-in. size. Other delivered quotations were $42.25 by the American Cast Iron Pipe Co. on 1000 tons of 24-in. and $40.65 by James B. Clow & Sons on 750 tons of 24-in. pipe. Prices have not been tested in the local market.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $42.20 to $46.20; 4-in., $46.20 to $50.20; Class A and gas pipe, $4 extra.

Structural Material.—Awards during the week totaled 5000 tons, and fresh inquiry is for 1500 tons and an unstated amount of steel for an office building in Chicago for Swift & Co. Recent estimates of the steel needed for the Chicago Board of Trade Building now place the figure at 18,500 tons. Local shops are well engaged, but books have been greatly reduced during the late fall weeks of inactive buying. Producers of shapes are accepting first quarter business at 2c. to 2.10c. per lb., Chicago.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—The Baltimore & Ohio has closed for 88,000 tons of standard-section rails for delivery in 1929. This tonnage was divided among the Bethlehem Steel Co., Carnegie Steel Co. and the Inland Steel Co. Included in this business is 3000 tons for the Baltimore & Ohio Chicago Terminal. The Missouri Pacific has ordered 50,000 tons

of rails and a round tonnage of track accessories. Fresh inquiry for rails from Western railroads total 50,000 tons. Orders for track accessories total 20,000 tons and inquiry totals 18,000 tons. Output by local rail mills is heavier, not because of the opening of the 1929 rail-rolling program, but due to releases of tonnages not expected by producers. The iron tie plate market is quiet. Light rails are moving only in carload lots.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Plates.—Of foremost interest in this market is an inquiry from the Missouri Pacific for more than 3000 cars, requiring in all not less than 38,000 tons of steel. The Missouri Pacific and the Chicago & North Western are in the market for locomotives. Specifications for car materials are reaching mills. The total volume to date, though small, is having an effect on rolling schedules, which have been gradually creeping ahead for the last two weeks. Many miscellaneous buyers, anticipating requirements after the turn of the year, are now making known their wants, which tend further to obligate local plate mills. Western Oil refiners are seeking 10,000 tons of plates for oil storage tanks. Although official announcements have not been made, it is known that local producers are accepting first quarter business at 2c. to 2.10c. per lb. Forward contracting has assumed fair proportions.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Tin Plate.—Prices are steady, and forward contracting is moderately active. Specifications against old low-priced contracts are heavy and hold mills close to capacity output.

Bars.—Demand for mild steel bars is turning upward. Shipments have grown a trifle in the week, and bar mill schedules are extended. Automobile parts makers, whose needs for steel come three to four weeks ahead of the demands from automobile manufacturers, are specifying in larger quantities, and they have arranged shipping schedules well into January. Several Chicago mills are operating at capacity, and deliveries are not better than three to five weeks. Farm implement manufacturers continue to expand production facilities, and they are taking increasing tonnages of steel. Some observers estimate that steel used in farm implements in 1928 will exceed by 60 per cent that used in the preceding year. First quarter business in soft steel is being taken at 2c. to 2.10c. per lb. A liberal number of specifications for alloy steel bars for delivery after the turn of the year have come to producers. Forward contracting continues at a fair rate. Demand for iron bars is light. Forward buying of rail steel bars at 1.95c., Chicago Heights, is active. Current specifications are fully equal to output.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Reinforcing Bars.—Dealers are engaged in trying to close old quotations before Dec. 15, which is the dead line on bids made prior to price advances on Dec. 1. New quotations on billet steel reinforcing bars out of Chicago warehouses are 2.35c. a lb. for orders of more than 18 tons, 2.60c. for 5 to 18 tons and 2.85c. a lb. for smaller lots. Fresh inquiry is moderately active, but for the most part in small tonnages. Shop operations average 50 per cent of capacity and deliveries are reasonably prompt.

Old Material.—A steel company has bought 20,000 tons of heavy melting steel at $15 a gross ton, delivered, and another has bought a tonnage at $14.50. Carlot sales of cast iron wheels have brought 25c. a ton above prices quoted. However, the demand for this grade is light and yards are overstocked. Considering the interest shown by users, carload sales are scarcely indicative of the market as a whole. Foundry grades are active in small lots. Railroad malleable is scarce; consumers outside of Chicago are willing to pay more than local users for this grade. Dealers continue to pay from $15 to $15.25 a gross ton for heavy melting steel to be delivered against old contracts. The supply of this grade is more liberal from most sources. The Santa Fe, the Illinois Central and the Chicago & Alton have lists to sell.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$14.50 to	$15.00
Shoveling steel	14.50 to	15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to	16.25
Hydraul. compressed sheets	13.00 to	13.50
Drop forge flashings	10.50 to	11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to	18.25
Railr'd tires, charg. box size	17.50 to	18.00
Railr'd leaf spring cut apart	17.50 to	18.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.00 to	16.50
Coil springs	18.25 to	18.75
Electric Furnace Grades:		
Axle turnings	14.50 to	15.00
Low phos. punchings	16.50 to	17.00
Low phos. plate, 12 in. and under	16.00 to	16.50
Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings	11.75 to	12.25
Short shoveling turnings	11.75 to	12.25
Machine shop turnings	8.00 to	8.50
Rolling Mill Grades:		
Iron rails	15.00 to	15.50
Rerolling rails	16.50 to	17.00
Cupola Grades:		
Steel rails less than 3 ft.	17.25 to	17.75
Steel rails less than 2 ft.	19.00 to	19.50
Angle bars, steel	16.50 to	17.00
Cast iron carwheels	14.25 to	14.75
Malleable Grades:		
Railroad	16.50 to	17.00
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.50 to	21.00
Iron car axles	26.50 to	27.00
Steel car axles	15.50 to	16.00
No. 1 railroad wrought	13.25 to	13.75
No. 2 railroad wrought	13.00 to	13.50
No. 1 busheling	11.50 to	12.00
No. 2 busheling	6.00 to	6.50
Locomotive tires, smooth	13.25 to	13.75
Pipes and flues	9.50 to	10.00
Cupola Grades:		
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	15.00 to	15.50
No. 1 agricultural cast	14.50 to	15.00
Stove plate	12.25 to	12.75
Grate bars	12.50 to	13.00
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.50c.
Reinforc'g bars, rail steel	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Aetna-Standard Acquires Tin Plate Pickling Process

YOUNGSTOWN, Dec. 11.—M. I. Arms, II, president Aetna-Standard Engineering Co., announces acquisition of American and Canadian rights to a new process in annealing and pickling tin plate, sheets and strip steel. The process, invented by William Hanby, London, England, metallurgist, will combine into one operation all the annealing and pickling processes now employed and it will reduce by 50 per cent the time required in such manufacture.

"Application of the new process will eliminate the necessity of expensive furnace installations now used in annealing," said Mr. Arms. "The process can be adapted for continuous rolling. This is the first revolutionary change in the method of annealing and pickling tin plate, strips and sheets since the beginning of the industry."

Aetna-Standard engineers are now designing the machinery to be employed in the process.

The Aetna company is installing a new seamless pipe mill for the Timken Roller Bearing Co., Canton; is building complete equipment for eight new tin plate mills for the Columbia Steel Corporation, Pittsburg, Cal., and also has under way a new type expansion steel tube mill for the National Tube Co.

Philadelphia

Steel Buyers Slow to Make New Contracts—Pig Iron Buying Increases

PHILADELPHIA, Dec. 11.—Except for a small volume of forward buying by steel consumers who regularly contract for each quarter's requirements, few contracts have been closed for next year. Buyers seem satisfied that the present levels of 1.90c. to 1.95c., Pittsburgh, on bars; 2.05c. to 2.15c., Coatesville, on plates, and 2.05c., f.o.b. nearest mill to consumer, on shapes will be obtainable during the next quarter This has developed a tendency among consumers to return to the former policy of buying material as needed. Specifications against last quarter contracts have diminished this month, and extension of present commitments into January is expected in many cases. Although prices for sheets in the next quarter show an advance, contracting lags and specifications to complete present commitments by the end of this month are light.

Pig Iron.—Occasional shading of the $21 per ton first quarter price on foundry iron is reported, and in some cases requirements for next year have been placed with delivery specified to begin this month, so that the current delivery price of $20.50 per ton would apply. Inquiry began to increase last week, and a number of desirable tonnages are in the market from eastern Pennsylvania consumers of foundry iron. The Lobdell Car Wheel Co., Wilmington, Del., is about to close on a carload of No. 2 foundry for prompt shipment and 300 tons of No. 3 foundry for January to March delivery. The Salem Brass & Iron Mfg. Co., Bridgeton, N. J., is inquiring for about 1500 tons of three grades for first quarter delivery, and the Ingersoll-Rand Co. is expected to enter the market this month for its first quarter requirements at Phillipsburg, N. J. Recent purchases have included 1500 tons of floor iron by the Baldwin Locomotive Works from a steel company furnace and 500 tons of foundry by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., divided between two eastern Pennsylvania furnaces. The Standard Steel Works Co., Burnham, Pa., has closed on about 5000 tons of low phosphorus, of which 2500 tons will come from England and 2500 tons from an eastern Pennsylvania steel company.

Bars.—Consumers show little interest in covering their requirements for first quarter, apparently satisfied that they can buy during the quarter as their needs develop. Quotations range from 1.90c. to 2c. per lb., Pittsburgh, or 2.22c. to 2.32c., delivered Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	20.25 to 20.75
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Plates.—First quarter contracts are limited to the consumers who usually cover their requirements in advance. In many cases, buyers evidently intend to cover their needs as they arise. Quotations are unchanged at 2.05c. to 2.15c. per lb., Coatesville, or 2.15c. to 2.25c., delivered Philadelphia. Specifications against current contracts are light, and some extensions into the next quarter are expected. Mills expect some substantial tonnages early in the new year from shipbuilding contracts, on which bids are being submitted by shipyards.

Shapes.—Most of the current buying is at 2.05c. per lb., nearest mill to consumer, or 2.11c., delivered Philadelphia, based on Pencoyd, Pa. This price is shaded occasionally on desirable projects, but 2c., mill, is generally the minimum. Shipbuilding promises some good tonnages of shapes for next year. Elimination of grade crossings on the Reading Railroad at Manayunk will require 6000 tons or more of shapes.

Sheets.—Only a small number of first quarter contracts are reported closed, but black sheets are being maintained at 2.85c. per lb., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia. Blue annealed sheets have developed a slight tendency toward weakness in the narrower sizes, on which competition from continuous sheets is encountered, so that the market today is quotable at 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia, the lower price applying on sales of the narrow widths.

Warehouse Business.—Buying from stock has been better in the early part of this month than in the same period of November. On recent sales in Delaware, it is noted that the Philadelphia district size extras on bars and shapes, which are slightly higher than the mill differentials, have been applied.

Imports.—In the week ended Dec. 8, arrivals at this port consisted of 12 tons of galvanized steel strips from the United Kingdom, 9 tons of steel billets from Sweden and 29 tons of steel scrap, of which 21 tons came from Germany and 8 tons from the United Kingdom.

Old Material.—Except for the purchase of about 5000 tons of No. 1 heavy melting steel by a Claymont, Del., consumer and a similar tonnage by a Coatesville, Pa., mill, the market continues quiet. Yard grade has been bought by a Harrisburg, Pa., consumer at $12 per ton, but shipments are still being made on contracts at $12.50 per ton, delivered. Cast scrap still shows an undertone of weakness, but no sales are reported.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅛-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Nineteen New Airports

Intention of establishing municipal airports was announced in 19 more cities during the latter part of November, according to the Department of Commerce.

The Truscon Steel Co., Youngstown, has removed its Cincinnati office to 1200 Fountain Square Building, 505 Walnut Street. J. L. Fink is district manager.

Cleveland

Steel Orders Holding Up Fairly Well—Automobile Companies Planning Large First Quarter Schedules

CLEVELAND, Dec. 11.—While there is some slowing down in the demand for finished steel, orders are holding up fairly well in view of the fact that with the reestablishment for the first quarter of the present prices on steel bars, plates and shapes buyers have no special incentive to get in specifications on existing contracts, and they want to have stocks reduced as much as possible by inventory time. An increase in specifications is expected later in the month for material to be delivered after Jan. 1. Not much contracting for the first quarter has been done in steel bars, plates and shapes, as mills are not pressing buyers for contracts and the latter are in no hurry to make commitments.

Mills are holding closely to the prices they named for the last quarter on the three products, the range being 1.90c. to 1.95c., Pittsburgh, the 2c. price usually applying only to small-lot buyers who do not contract. On steel bars, outside mills, when using the Cleveland base, are generally quoting 1.95c., Cleveland, both for local delivery and for shipment to other points in the territory. However, outside mills are holding strictly to a Pittsburgh base for less than car lots. Local mills continue to quote steel bars at 1.90c., mill. Some recent shading of this price developed in business from the implement manufacturers in competition with rail steel bars, which are quoted at 1.85c., mill, for uses other than for reinforcing work. Most of the buyers of alloy steel bars have covered for the first quarter. Present prices on bolts and nuts and wire rods have been reaffirmed for the first quarter, but a $2 a ton advance has been announced on wire products.

Steel orders from the Michigan territory are reflecting the slowing down of the automotive industry for inventories and the bringing out of new models, but a heavier demand is expected from that source late in the month for January shipment. Motor car builders are planning large production schedules for the first quarter. Local plants engaged in making automobile forgings and springs continue fairly busy, but stamping plants have curtailed operations, as some of the automobile companies are not releasing specifications. The Chevrolet Motor Co. is getting under production on its new models more slowly than was expected.

Structural inquiry is light. Railroads in this territory have not yet come in the market for their 1929 rail requirements.

Pig Iron.—The buying movement continues to taper off. Sales by Cleveland interests during the past week were 18,000 tons, compared with 32,000 tons the previous week. Most of the large consumers appear to be covered for the first quarter and some have bought for the first half. Not a great deal of inquiry is pending. Prices are firm and unchanged. Most sellers have good order books for the first quarter, so that competition for business at competitive points is not as keen as it was in the early part of the year. Cleveland furnaces are holding to $18.50 for foundry and malleable iron for outside shipment, and another Lake furnace remains on an $18.50 base for western Ohio and parts of Indiana. In Michigan, the market is firm at $20. Some effort is being made to establish a 50c. differential on malleable iron over foundry iron by some furnaces that have been selling both grades at the same price. Shipments have started out well for December, but are expected to slow down during the latter part of the month. One large consumer in the automotive field is taking more iron this month than in November. On Ohio silvery iron, $26 appears to have become the general price for 8 per cent iron, although one producer is asking $27 in some cases.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent	29.00
Basic Valley furnace	17.50
Stand. low phos., Valley	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—Wire rods have been re-established for the first quarter at the present price of $42, Cleveland and Pittsburgh. A local producer has made a few round-lot sales of sheet bars at $34, Cleveland. This mill is asking the same price for billets and slabs, or $1 a ton higher than the prices quoted by Youngstown mills, but has made no sales of these products for the coming quarter.

Wire Products.—A $2 a ton advance on nails and wire and on all other wire products, except fence, has been made by leading producers, which are now quoting nails at $2.65 per keg, Cleveland, and bright plain wire at 2.50c. per lb. Nails have been moving slowly, and the price advance may stimulate orders against outstanding contracts.

Fluorspar.—Some of the large consumers are negotiating for gravel fluorspar for next year. Producers are meeting with some price resistance to their recent $1 a ton advance to $18, mines, so that this price has not yet been established except on some small-lot sales.

Bolts, Nuts and Rivets.—Bolts and nuts have been reestablished at the present discount of 70 per cent off list for the first quarter and rivets have been established at the present prices for the coming quarter. Semi-finished hexagon nuts also have been reestablished at 70 per cent off list for the first quarter. Producers are now sending out contract blanks to their customers. Cap and set screws have been advanced 5 points, the new prices applying to current orders and to the first quarter. Railroad spikes have been reestablished at 2.80c., producing point. Large rivets are quoted at $2.90 per 100 lb., Cleveland and Pittsburgh, and $3, Chicago, and small rivets are 70 and 10 per cent off list at the three producing points.

Strip Steel.—Prices on hot-rolled strip have settled pretty generally to 1.80c., Pittsburgh, for material wider than 6 in. and to 1.90c. for 6 in. and narrower. There has been a moderate amount of contracting for the first quarter at these prices. Only small lots are bringing $2 a ton higher prices, but the higher prices apply to very little contract tonnage. Cold-rolled strip contracts are being taken at 2.85c., Pittsburgh. A 2.95c. price applies to small lots and generally to consumers who do not contract. Specifications for both hot and cold-rolled strip have slowed down.

Sheets.—Specifications have declined, and some of the mills have reduced their backlogs considerably. Many consumers are evidently holding back orders against existing contracts until the deadline date, Dec. 15, with the expectation that mills will not make shipments until after Jan. 1 or after inventories. Many of the larger consumers probably will have enough material coming in at the old contract prices to last them through January. There has been a fair amount of contracting for the first quarter at the new prices, and mills have received liberal specifications for auto body sheets for January shipment, some being well filled up with that grade for next month. Mills able to accept orders for December shipment are still making sales at the old price, or $2 a ton below the first quarter price. Some buyers are resisting the $2 a ton advance on tin plate.

Warehouse Business.—Small-lot orders have fallen off, but jobbers report an increase of good-sized orders from buyers who need material for use during the remainder of the year

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.85
No. 9 gal. wire, per 100 lb	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

and who are turning to warehouses to take care of these early requirements.

Coke.—Domestic coke is moving a little better than recently. There is very little new demand for foundry coke, although specifications against contracts are holding up fairly well. Ohio by-product foundry coke is unchanged at $7.75, Painesville, for December shipment.

Old Material.—The scrap market is firm but dull. There is no new consumer demand, and some of the mills are restricting shipments. Dealers are buying small lots at quoted prices to fill outstanding orders. They are able to pick up small lots of blast furnace scrap at $11, or slightly higher, but would pay $11.50 for round tonnages. While the demand for scrap has declined, the production also has fallen off somewhat owing to the slowing down of the automotive industry. In the Valley district, No. 1 heavy melting steel is bringing $16.50 to $17 from dealers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	14.00 to 14.50
Compressed sheet steel	14.00 to 14.50
Light bundled sheet stamp'gs	12.00 to 12.50
Drop forge flashings	12.25 to 12.75
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	14.50 to 15.00
No. 1 busheling	12.25 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	11.00 to 11.50
Mixed bor'g and short turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

New York

Subway Requires 34,000 Tons of Fabricated Steel—Interest in Pig Iron Diminishes

NEW YORK, Dec. 11.—Sales of pig iron in this district totaled 6000 to 7000 tons, or only about one-third of the bookings of the previous week. Interest in the market is plainly diminishing as the holiday and year-end shutdowns approach. Shipments, although not so large as during the season of navigation, when the barge movement was under way, are holding up to recent levels. Foundry melt is being maintained, and the fact that users are taking all the iron due them indicates that they have no inventory problem. Contracting for first quarter has not been so heavy in this district as in some other sections of the country. Possibly three-quarters of the buyers have covered their estimated requirements, and there is no rush on the part of the remaining consumers to enter the market. The only new first quarter inquiry of any size that has appeared is one from the General Electric Co. for about 4000 tons for its eastern plants, including those at Bayway, N. J.; Schenectady and Elmira, N. Y.; Pittsfield, Lynn and Everett, Mass. The Burnham Boiler Corporation, Irvington, N. Y., has bought 600 tons of foundry iron for first quarter shipment to its Lancaster, Pa., plant. The A. P. Smith Mfg. Co., East Orange, N. J., has placed 150 tons of foundry. Buffalo foundry iron continues to range from $17.50 to $18, base furnace. Eastern Pennsylvania foundry iron for delivery in this section is weak at $20, base furnace. First quarter quotations on Dutch and Indian foundry iron are $22 for No. 1X and $21.50, base, duty paid. The ocean freight rate on Dutch iron has been advanced 89c. to $3.81 a gross ton.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—Sales of several lots of ferromanganese, totaling about 750 tons, for next year's delivery are reported. Quotations are unchanged at $105, seaboard basis. Business in spiegeleisen is confined to sales of carloads and small lots and quotations are unchanged at $34, furnace, for the 19 to 21 per cent alloy.

Reinforcing Bars.—The Carroll-McCreary Co., Inc., Long Island City, has been awarded 500 tons for a Pennsylvania Railroad bridge at Hackensack, N. J., and 200 tons for the Abraham Lincoln High School in Brooklyn. Several new projects of fair size are being figured, the largest being a building for the Hoffman Beverage Co. in Newark, calling for 800 tons, and two additional sections of the New York subways which will require about 750 tons. Prices are firm at 2c., Pittsburgh, for 40, 50 and 60-ft. lengths available for shipment direct from mill, and 2.25c., Pittsburgh mill warehouse, for the cut lengths. Out of New York warehouse, distributers are quoting 2.85c. per lb. for lots of 5 tons or more, 3c. for lots of 2 to 5 tons and 3.25c. for less than 2 tons, all delivered at job.

Plates, Shapes and Bars.—Structural steel work is predominant in the local steel market, which otherwise shows signs of lagging far behind the

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

activity of October and November. Specifications for miscellaneous steel products are in fair volume, but new business is light. Plates are conspicuously dull, although some large tonnages are in prospect for early in the new year in shipbuilding and pipe lines. New York subway work is outstanding among pending fabricated steel jobs, bids having been called for on two sections of the Houston Street project requiring 34,000 tons of steel. A building for the Internal Revenue Bureau in Washington will take 10,000 tons. Among the larger awards of the past week was 5200 tons for a loft building at Seventh Avenue and Thirty-ninth Street. The Structural Steel Board of Trade of New York reports that lettings in the metropolitan district in November, exclusive of subways and bridges, were 27,500 tons, compared with 50,300 tons in October and 34,000 tons in November, 1927. As prices on plates, shapes and bars for the coming quarter are to be unchanged, contract buyers seem in no hurry to sign up for their forward requirements. Most of the steel companies' contracts require that specifications in full against fourth quarter contract shall be sent to the mills by Dec. 15, and it is expected that many buyers will provide for their January needs before making new contracts.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c., bar iron, 2.14c. to 2.24c.

Sheets.—Contracting for the first quarter has not been in large volume, but this is not surprising in view of the fact that many consumers will have sufficient tonnage coming to them on lower-priced fourth quarter contracts to provide for all or part of their needs in January. Some buyers are trying to escape shipment of their remaining fourth quarter tonnage until the last week of the month or early in January, but most mills insist on shipping at their earliest convenience.

Cast Iron Pipe.—Quotations of Northern makers of pressure pipe have shown further advances recently, and the market is now quotable at $39.60 to $40.60 per net ton, delivered New York. Inquiries are mostly for small tonnages. Yonkers, N. Y., opens bids Dec. 13 on about 300 tons of water pipe. Prices are being asked by Carlo Petrillo, Mount Vernon, N. Y., on about 150 tons of 3, 4, 6, 8, 12, 16, 20 and 42-in. pipe and about 25 tons of fittings for a section of subway in Brooklyn, for which he has received the contract. Some inquiry for gas pipe to be delivered next spring is reported from private corporations.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $39.60 to $40.60; 4-in. and 5-in., $44.60 to $45.60; 3-in., $54.60 to $55.60; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Most jobbers report the volume of orders, which was sizable earlier in the month, to be diminishing with the approach of the holidays. There is still some structural steel business, but tonnages are smaller than in the season of greatest activity. Sheet prices are being maintained with little shading, despite a quiet market.

Coke.—Business is limited to shipments on contracts, orders for spot shipment being smaller than usual. The Connellsville market is unchanged at $3.50 to $3.75 per net ton, ovens, for standard foundry and $2.85 to $3.05, ovens, for standard furnace. Special brands are unchanged at $4.85 per net ton, ovens. Delivered prices of these brands are $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product foundry coke prices are unchanged at $9 to $9.40, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Prices of most grades of scrap show a slightly stronger tone, although the number of transactions with eastern Pennsylvania consumers has not increased appreciably. Brokers are offering $14.50 to $15 per ton, delivered, on No. 1 heavy melting steel and in some cases are reported to have paid as much as $15.50 per ton, delivered to a Coatesville, Pa., mill. Some of the firmness that has developed in the past week is attributed to the purchase of 5000 tons each by consumers at Coatesville, Pa., and Claymont, Del. At the recent opening of bids on the Pennsylvania Railroad list of about 60,000 tons of scrap, of which about 14,000 tons was heavy melting steel, $18.10 per ton, is reported to have been offered for the steel. Bids were opened this week on about 3000 tons of scrap on the list of the Delaware, Lackawanna & Western and a like tonnage offered by the Lehigh Valley Railroad.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.50 to	$12.00
Heavy melting steel (yard)	8.50 to	9.50
No. 1 hvy. breakable cast.	11.25 to	11.75
Stove plate (steel works)	8.00 to	8.50
Locomotive grate bars		8.50
Machine shop turnings	7.25 to	7.50
Short shoveling turnings	7.25 to	7.50
Cast borings (blast furn. or steel works)	6.75 to	7.00
Mixed borings and turnings	6.75 to	7.00
Steel car axles	17.00 to	17.50
Iron car axles	25.25 to	26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	8.00 to	8.50
No. 1 railroad wrought	12.25 to	12.75
No. 1 yard wrot., long	11.25 to	11.75
Rails for rolling	13.00 to	13.50
Cast iron carwheels	12.00 to	12.50
Stove plate (foundry)	9.25 to	9.50
Malleable cast (railroad)	10.00 to	10.50
Cast borings (chemical)		11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

New Method of Quoting on Steel and Iron Boiler Tubes

A new mode of quotation is to be put into effect by makers of lap-welded steel and charcoal iron boiler tubes, effective as of Jan. 1. Weights and list prices used by manufacturers of seamless boiler tubes are to be used from that date. It will be observed in the new schedule that the carload lot base discounts on lap-welded steel tubes are the same as those now quoted on hot-rolled seamless tubes, but against a supplementary discount of 5 per cent on seamless tubes in lots of a carload or more, that on lapwelded steel tubes is two fives. Also, that against less carload discounts of four points less than on carloads on seamless tubes, the basing discounts on lapwelded steel tubes are four points less than carload lots on lots down to 10,000 lb. and six points less on lots of less than 10,000 lb.

Discounts as follows, on full carload lots, are being quoted from the revised list prices f.o.b. Pittsburgh:

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	3
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

Beyond the above base discounts two fives are being quoted on carload lots of lap-welded steel tubes.

On quantities 10,000 lb. to carloads basing discount is lowered four points and two fives preferential are allowed.

On quantities less than 10,000 lb., basing discount is lowered by six points and one five preferential is allowed.

On charcoal iron boiler tubes the base discount is subject to 10 per cent preferential discount on full carload shipments. On shipments of 10,000 lb. to carload, five per cent preferential and on shipments of less than 10,000 lb., no preferential discount is allowed.

The price list to which the new discounts will apply follows:

External Diameter Inches	Standard Thickness Minimum: Birmingham Wire Gage	Standard Thickness Minimum: Inches	Price per Foot: Standard Thickness	One Extra Wire Gage	Two Extra Wire Gages	Three Extra Wire Gages	Four Extra Wire Gages
1	13	0.095	0.32	0.35	0.38	0.41	0.45
1¼	13	0.095	0.30	0.33	0.36	0.39	0.43
1½	13	0.095	0.28	0.31	0.34	0.38	0.42
1¾	13	0.095	0.24	0.26	0.28	0.31	0.34
2	13	0.095	0.22	0.25	0.28	0.31	0.34
2¼	13	0.095	0.25	0.29	0.31	0.35	0.38
2½	12	0.109	0.32	0.35	0.39	0.43	0.47
2¾	12	0.109	0.35	0.39	0.43	0.47	0.52
3	12	0.109	0.39	0.42	0.47	0.52	0.58
3¼	11	0.120	0.46	0.51	0.56	0.63	0.68
3½	11	0.120	0.50	0.55	0.61	0.68	0.73
4	10	0.134	0.64	0.70	0.78	0.84	0.95
4½	10	0.134	0.72	0.79	0.88	0.95	1.07
5	9	0.148	0.88	0.98	1.07	1.20	1.29
6	8	0.165	1.18	1.29	1.45	1.56	1.68

St. Louis

Pig Iron Market Quiet Except for 15,000-Ton Sale of Basic —Steel Orders Fairly Good

ST. LOUIS, Dec. 11.—What otherwise would have been a very quiet week in pig iron was marked by the purchase of 15,000 tons of basic iron by an East Side melter from the St. Louis Gas & Coke Corporation for first quarter delivery. This maker's sales of foundry iron amounted only to 650 tons; the largest order was 200 tons for immediate shipment to a Belleville stove foundry and the remainder was first quarter delivery. The bulk of the foundry iron for first quarter consumption probably has been bought. Stove and jobbing foundries in the district are extremely busy, preparatory to closing down about Dec. 15 until after the holidays. The Granite City maker shipped 37,000 tons and sold 66,520 tons of pig iron during November, breaking all records for a month's shipment and sales. It is expected that the second furnace, which has been down for relining and other repairs for several months, will be blown in some time this week. The market is firm, with prices unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	20.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 81c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Domestic coke is in heavy demand as a result of the cold weather, and piles at by-product ovens in the district are being materially reduced. Dealers outside of St. Louis are taking liberal shipments, but those in the city continue to depend upon local piles for their stocks and are buying as they sell. Demand for industrial grades is good. Prices are unchanged.

Finished Iron and Steel.—The Granite City Steel Co. reports orders during the last week were greater than the volume for the same week last year. Galvanized sheets were most in demand among a greatly diversified business. Buying is almost entirely for prompt shipment. Automobile manufacturers have indicated that strip steel requirements for first quarter will be much heavier than usual for this period, and business is expected to be placed within the next week. The low bidder on the River des Peres sewer project, requiring 2000 tons of reinforcing bars, previously reported as pending, is the W. E. Callahan Construction Co., Arcade Building. The large fabricators of structural steel report a dearth of business, while the smaller plants are in much better shape because of the number of small jobs being placed.

Old Material.—Dealers in old material expect a heavy buying movement soon; some believe it will arrive before the first of the year, while others predict it for the first week in January. There is no consumer buying now except of such items as may be needed for fill-in purposes. Dealers are buying only to cover contracts. The only change in prices is an advance of 25c. on railroad springs. Railroad lists include: Pennsylvania Lines, 57,440 tons; Chicago, Milwaukee, St. Paul & Pacific, 2600 tons; Wabash, 2642 tons; Southern Pacific, 3000 tons; Missouri-Kansas-Texas, 1500 tons; Louisville & Nashville, 691 tons; Kansas City Southern, 431 tons; Chicago, Rock Island & Pacific, 207 tons; Ann Arbor, 375 tons; Great Northern, 167 carloads; Chicago & Eastern Illinois, 17 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.25 to $13.75
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	9.00 to 9.50
Steel car axles	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	12.50 to 13.00
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machine cast	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Birmingham

Heavy Pig Iron Bookings for First Quarter—Steel Operations at a High Rate

BIRMINGHAM, Dec. 11.—The tone of the pig iron market is still buoyant. Purchases during the week were fairly heavy; the major portion was for delivery through the first quarter. Bookings for the next quarter are larger than for any previous quarter for some time. Only a few of the more important consumers remain uncovered. Radiator shops plan to resume operations shortly after the first of the year. One pig iron producer is still quoting $17 on No. 2 foundry, while others are maintaining a $16.50 base. All furnaces have been making heavy shipments, and very little iron has been stocked in the past several weeks. Of the 19 furnaces in blast, nine are on foundry, eight on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$16.50 to $17.00
No. 1 fdy., 2.25 to 2.75 sil.	17.00 to 17.50
Basic	16.50

Finished Steel.—Mills have adjusted prices on bars, plates and shapes, placing them in line with quotations elsewhere. Day to day business continues on a high plane, and the usual seasonal let-up has not developed. Specifications are coming in at a good rate for this season. Rail orders warrant steady operations for several months. Fabricated structural steel schedules in the district are in good condition. The Nashville Bridge Co. has booked 800 tons for bridges for the Louisville & Nashville Railroad. The Tennessee company is operating nine open-hearths at Ensley, an increase of one in the week, seven are active at Fairfield and the Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—Dallas, Tex., has awarded a project requiring more than 20,000 tons of pipe to the United States Cast Iron Pipe & Foundry Co. Decision has been pending for several weeks as to steel or cast iron pipe. Injunctions filed since the award have held the contract up but it is expected the matter will be cleared up shortly. This is the largest order placed in this district in several months. Other new business has been confined to a light aggregate of small orders. Inquiries are increasing as municipalities begin to estimate their requirements for the coming year. Some public utilities have asked preliminary figures for use in estimating budgets. Plant operations and forward bookings are the lightest in some time. Quotations are unchanged from the base of $37 to $38 on 6-in. and larger sizes.

Coke.—Consumers are maintaining an active interest in first quarter re-

quirements and the total needed for this period is fairly well covered. Improved conditions in the pig iron market have influenced more extensive coverage in the coke market than is usual at this season. Domestic sizes are in better demand. The base price of $5 is being maintained.

Old Material.—Consumers are buying for immediate requirements and keeping stocks low for approaching inventories. Shipments are consequently light. Dealers' stocks are low in several lines. Prices have not changed in two weeks.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	$12.00 to 12.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Pacific Coast

Standard Oil Co. Inquires for 58,000 Boxes of Tin Plate—Steel for Building Fairly Active

SAN FRANCISCO, Dec. 8 (*By Air Mail*).—Structural steel and reinforcing steel bars were the most active products during the past week. The largest award was 412 tons of bars for the East Bay Municipal Utility District at Oakland, placed with two San Francisco interests. Tin plate mill representatives are keenly interested in the inquiry of the Standard Oil Co., San Francisco, for 45,000 boxes of 14¼ x 18½ in. and 13,000 boxes of 10 x 20 in.

Pig Iron.—Sales and inquiries involve relatively unimportant tonnages. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—A fair tonnage of reinforcing steel bars was placed this week. Included among awards were 300 tons for a power house at Renton, Wash., and 248 tons for the South Spillway, Oakland, placed with the Pacific Coast Steel Co. and 173 tons for the Jackson Creek Spillway and the Pardee Reservoir, Oakland, booked by Soule Steel Co. Pending business exceeds 5500 tons. New inquiries of the week include 355 tons for a rest home in San Francisco and 310 tons for a hotel at Fairfax, Cal. While merchant bar material continues fairly firm at 2.30c., c.i.f. Coast ports, out-of-stock prices in the Los Angeles and San Francisco districts remain at 1.80c., base. Imports of foreign reinforcing steel bars have fallen off almost to nothing.

Plates.—Plate sales and inquiries are limited, with one exception, to lots of less than 100 tons. The Marin Municipal Water District, San Rafael, Cal., is calling for bids, to be opened Dec. 18, on a 2,000,000-gal. steel tank requiring 250 tons of plates. From present indications, the total plate tonnage for this year will be approximately 20,000 tons under the total booked last year. No change in prices has occurred, 2.25c., c.i.f., being general.

Shapes.—Although more than 5000 tons of structural shapes is being figured on, awards this week were limited to four projects in excess of 100 tons. The Baker Iron Works took 190 tons for an office building in Santa Monica, Cal., and the Isaacson Iron Works will fabricate 200 tons for a plant addition for itself in Seattle. The Judson-Pacific Co. took 150 tons for the Grace Cathedral in San Francisco and the Golden Gate Iron Works secured 100 tons for a market building at San Jose, Cal. Quotations on plain material continue unchanged and firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is by no means heavy and little new business is expected until after the first of the year. L. Coluccio, Seattle, secured an additional 400 tons of 24-in. pipe for the Volunteer Park improvement project for the city. Henry Sacco was low bidder on 209 tons of 8 and 12-in. Classes B and C pipe for the improvement of West Holden Street, Seattle. Bids were opened this week by Burbank, Cal., for 323 tons of 4 to 8-in. Class B pipe. Wilbur N. Edgley, Los Angeles, was low bidder on 548 tons of 2 to 12-in. Class B pipe for the improvement of Arlington Street, Los Angeles.

Steel Pipe.—Pipe mill representatives report a continuation of the rather heavy demand for oil country goods, and especially for well casing to take care of the new wells being brought in in the Santa Fe Hills fields. Stocks of standard pipe in distributers' hands are reported to be in good shape. With the approach of the inventory period, little business is expected during the remainder of the year.

Coke.—About 5000 tons of English beehive and by-product foundry coke has arrived on the Coast, most of it for foundries in the Los Angeles and San Francisco districts. Prices continue unchanged as follows: $11.50 to $13 a net ton, delivered incoming dock, on by-product coke and $16 a net ton on beehive coke.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Canada

Pig Iron Prices Weak and Show Variations—Building Activities Large Despite Winter Weather

TORONTO, ONT., Dec. 11.—According to local blast furnace representatives, the demand for merchant pig iron in the Canadian markets has steadily increased during the past month or six weeks, while sales for the year show an advance of more than 20 per cent over those of 1927. Producers have opened books for first quarter contracts and already a fairly large number of melters have covered for the first three months of 1929. Inquiries for first quarter are appearing in large number, and indications are that contracts for that period will make a new quarterly record. While local interests believe that higher prices are warranted in the face of $18 to $19 Buffalo quotations, producers have been unable to agree, and while some have quoted $24.10, others are naming $23.60, and in some instances iron has been offered at $23.10, Toronto. One Canadian producer is out of the market, declining to sell at the present level. United States producers are supplying the Canadian agricultural implement requirements, but otherwise they are not strong in competition with Canadian furnaces at present. Imports of pig iron range from 4000 to 5000 tons a month, by far the greater part of which is from the United States. Only a limited tonnage of British iron has been piled in Canada against winter requirements.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Although the first snows of winter have appeared, building construction in Canada has not slowed down. The demand for structural steel and reinforcing bars for building and bridge construction continues in large volume. The Manitoba Bridge Co., Winnipeg, Man., has received an order for 3000 tons

of steel from the Canadian National Railways for a bridge over Minnewaskta Creek near Miniota, Man.; the Eastern Canada Steel & Iron Works, Ltd., Quebec, Que., was awarded contract for 300 tons of steel for Scott Street bridge over the St. Charles River at Quebec for the Provincial Government Department of Public Works; the Dominion Bridge Co., Lachine, Que., received contract for 600 tons for Masonic Temple on Sherbrooke Street, Montreal; the Dominion Bridge Co., Toronto, has contract to supply 1250 tons of steel for office building at Bay and Adelaide Streets, Toronto, for the Canada Permanent Mortgage Corporation, and 50 tons for New Queen's Hotel at Belleville, Ont. Orders pending include 300 tons for bridge on St. Clair Avenue, to be constructed by the City of Toronto and York Township; 350 tons for normal school at Quebec, Que., for Rev. Ursuline Sisters.

Old Material.—In most cases, consumers are holding their orders as low as possible to keep prices at a minimum and are leaving dealers somewhat in doubt as to what future requirements will be. Some consumers, however, have covered first quarter needs. While Toronto dealers have made no change in their buying price lists for the week, a few minor advances have gone into effect in Montreal.

Dealers' buying prices:

	Per Gross Ton		
	Toronto	Montreal	
Heavy melting steel	$9.50	$7.00 to	$7.50
Rails, scrap	10.00		9.00
No. 1 wrought	9.00	11.00 to	11.50
Machine shop turnings	7.00		5.00
Boiler plate	7.00		6.00
Heavy axle turnings	7.50		6.50
Cast borings	7.50		5.00
Steel turnings	7.00		5.50
Wrought pipe	5.00		5.00
Steel axles	14.00		20.00
Axles, wrought iron	16.00		22.00
No. 1 machinery cast	....	16.00 to	17.00
Stove plate	....		13.00
Standard carwheels	....		16.00
Malleable	....		13.00
	Per Net Ton		
No. 1 machinery cast	15.00		....
Stove plate	9.00		....
Standard carwheels	13.00		....
Malleable scrap	13.00		....

Boston

Everett Furnace Sells 12,000 Tons of Pig Iron to Heater Manufacturer—Scrap Exports Continue

BOSTON, Dec. 11.—The Mystic Iron Works has sold 12,000 tons of pig iron for first quarter delivery to a radiator and heater manufacturer, part No. 2 plain and part No. 2X, for delivery by barge and rail. Details regarding prices are withheld, but it is understood that quotations coincided with those of Buffalo furnaces. Sales of Mystic iron the past week otherwise were comparatively small. Numerous small tonnages were placed, however, at $21 a ton, on cars Everett, Mass., for No. 2X, or $23.27 delivered, and others at $20 a ton, furnace, or $23.65 a ton delivered. The company is well sold up to April 1. It has contracted to deliver between now and April 1 in excess of 36,000 tons for water shipment alone, 11,500 tons of which is for January shipment. In addition to the Mystic bookings the past week, a fair tonnage of Buffalo and east of Buffalo iron was sold, also some foreign iron. About 1000 tons of Lake charcoal iron has been booked the past three or four weeks for first quarter delivery at $24 a ton, base furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25		$22.91
*Buffalo, sil. 2.25 to 2.75		23.41
East. Penn., sil. 1.75 to 2.25	$24.15 to	24.65
East. Penn., sil. 2.25 to 2.75	24.65 to	25.15
Va., sil. 1.75 to 2.25		26.91
Va., sil. 2.25 to 2.75		27.41
Ala., sil. 1.75 to 2.25	23.41 to	25.77
Ala., sil. 2.25 to 2.75	23.91 to	26.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Coke.—Aside from a quickening in the movement of domestic coke, the result of colder weather, there is little change in the coke situation. By-product foundry coke is still available at $11 a ton, delivered within a $3.10 freight rate zone.

Bars.—Edward A. Tucker Co., Boston, has been awarded 650 tons of reinforcing bars for the United Shoe Machinery Corporation's Boston building, the largest job let in this territory in several months. The market on small business is usually 3.10½c. per lb., base, from stock, and at 3.01½c. on 25 to 75-ton lots. A slight improvement in the demand for soft steel bars is noted, with the market 1.90c. to 2c. per lb., base Pittsburgh, depending on quantity.

Warehouse Business.—Wire nails have been advanced $2 a ton. The movement of material out of warehouses is increasing, and is far ahead of that done in December, 1927.

Pipe.—Pawtucket, R. I., closed bids Dec. 4 on about 1200 tons of 6 to 16-in. pipe. The contract was awarded to a local concern, and it is reported the Warren Foundry & Pipe Co. will supply the material. Herbert Kennedy Co., New York, representing French pipe interests, submitted a bid approximately $4 a ton under that of the Warren Foundry & Pipe Co., but the city officials announced they would use American-made pipe. Portland, Me., has closed privately on 650 to 700 tons of 6 to 16-in. pipe for spring delivery. It is understood the business was divided between two American makers. Kingston, Mass., has closed bids on 200 tons of pipe, but has made no award. Salem, Mass., will take bids on Dec. 11 for 100 tons of 12-in. pipe. Private business for prompt delivery is exceptionally good for this time of the year and totaled about 1000 tons the past week. Prices are stronger, 4-in. stock now being $47.10 to $48.10 a ton, delivered common Boston freight rate points, and 6-in. and larger, $44.10 to $45.10, with differentials of $3 to $4 a ton on Class A and gas pipe.

Old Material.—The market for the materials most in demand, namely, heavy melting steel and mixed borings and turnings, is firmer. Steel mill borings, forge flashings and shafting are easier. Dealers expect a further improvement in values of heavy melting steel based on the recent sale of Baltimore & Ohio Railroad and Pennsylvania Railroad scrap to consumers. New England scrap owners are reluctant to sell at present prices; consequently the movement out of New England is limited, although somewhat larger than a week ago. A steamer has completed loading 3500 tons of scrap for Danzig. One agent has a 3000-ton cargo to load, and it is intimated still another lot of 3000 to 5000 tons will be shipped within a month. It is probable that 1929 scrap exports from Boston will exceed those of 1928; most of the material has been consigned to Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to	$11.25
Scrap T rails	10.50 to	11.00
Scrap girder rails	10.00 to	10.25
No. 1 railroad wrought	11.00 to	11.50
No. 1 yard wrought	9.00 to	9.50
Machine shop turnings	6.25 to	6.50
Cast iron borings (steel works and rolling mill)	5.75 to	6.00
Bundled skeleton, long	9.00 to	9.25
Forge flashings	9.00 to	9.50
Blast furnace borings and turnings	5.50 to	6.00
Forge scrap	6.00 to	6.50
Shafting	13.50 to	13.75
Steel car axles	16.00 to	16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to	10.00
Rails for rolling	11.00 to	11.50
Cast iron borings, chemical	10.00 to	10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to	$14.50
No. 1 machinery cast	15.00 to	15.50
No. 2 machinery cast	13.00 to	13.50
Stove plate	11.00 to	11.50
Railroad malleable	15.50 to	15.75

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Tennessee Producer Advances Pig Iron 50c.—Sheet Mills in Better Position Than a Month Ago

CINCINNATI, Dec. 11.—A Tennessee furnace has announced an advance of 50c. a ton to $17, base Birmingham, but Alabama pig iron producers, with one exception, still are quoting $16.50. However, all Southern sellers are expected to be on the basis of $17 within a short time. Transactions in the pig iron market in the past week were unimportant, total sales having been less than 3000 tons. Dealers are of the opinion that the present lull in buying will persist until after the annual inventory period. Inquiries are scarce; the only pending order of consequence is for 400 tons of Northern foundry for a Springfield, Ohio, consumer. Small lots of Valley iron are being sold by local brokers at or under $18, Valley furnace. Southern Ohio foundry iron is nominally quoted at $18.50, base Ironton.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.39
Ala. fdy., sil. 1.75 to 2.25	$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.69
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Shipments of by-product foundry coke are of fair volume, although demand from foundries connected with the automotive industry has been light. Sales of domestic grades are stimulated by the fact that an increase of 50c. a ton is to be made on Jan. 1. A local dealer has sold 1000 tons of beehive foundry coke to a nearby consumer. Wise County beehive foundry is quoted at from $4.25 to $5.25 and furnace coke at $3.50.

Old Material.—The scrap market has been fairly firm. While there has been some letdown in specifications from district steel plants, consumption in general is satisfactory. Railroad lists closing this week include: Southern, 9000 tons; Norfolk & Western, 5000 tons; Louisville & Nashville, 6000 tons, and Chesapeake & Ohio, 3000 tons.

Finished Material.—From the standpoint of unfilled tonnage, district sheet mills are in a much better position than a month ago, despite the fact that automobile makers concentrating on new models have failed to come into the market to any appreciable extent for their sheet requirements. The betterment is attributed to the healthy demand from diversified sources, and, as automobile manufacturers will soon be placing business in larger volume, sheet producers are confident of entering the first quarter well fortified with orders. Mill operations have been sustained at 100 per cent of capacity and no departure from this schedule is expected in the next two weeks. Prices are steady and considerable business has been taken at 2c. to 2.10c., base Pittsburgh, for blue annealed; 2.85c. for black; 3.60c. for galvanized, and 4.10c. for automobile body stock. Heavy steel products have been rather quiet, with quotations firm at 1.90c. to 2c., base Pittsburgh, for bars, shapes and plates. Rail steel reinforcing bars are priced at 1.90c. to 1.95c., base mill. Fabricating shops in this district are only fairly busy, and in most cases are in need of considerable work.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.25 to 13.75
Loose sheet clippings	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.75 to 9.25
No. 1 busheling	10.75 to 11.25
No. 2 busheling	6.25 to 6.75
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
Short rails	19.00 to 19.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 10.75
Railroad malleable	14.25 to 14.75
Agricultural malleable	13.25 to 13.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Youngstown

Demand Tapering in Most Steel Products

YOUNGSTOWN, Dec. 11.—Not much variation is observed in the rate of demand for pipe. Strip business has been swelled by the placing with local producers of one or two good-sized first quarter contracts, but in most other finished steel products business has lately been declining sheet mill operating schedules have become a little irregular, since many users of sheets are anxious to escape carrying sizable stocks at the end of the month and are specifying cautiously. November specifications were so large with most makers that backlogs were pretty well reduced; as an advance of $2 a ton is sought on first quarter tonnages, buyers are disposed to go slowly in the matter of commitments for that period until they are entirely satisfied that the higher prices will hold. Yesterday was the final day for specifying on fourth quarter sheet contracts and this week will tell whether buyers released tonnages or elected to take their chances on paying $2 a ton advance, which the mills threatened to do if January shipment was specified.

Tin plate capacity is becoming more fully engaged as tonnages are released on early 1929 requirements. Wire products are only moderately active, but there is the possibility of an early increase in demand in view of the fact that first quarter prices have been advanced $2 a ton over those for the quarter now drawing to a close. In naming the new schedule, mills have adopted a new mode of quotation; instead of quoting jobbers' carloads they are quoting as the "market" the prices named to retailers or consumers able to buy in carload lots. For several months, the mills have been trying to apply an extra of 10c. per 100 lb. on carload lots going to other than jobbers. The price of nails to the latter has been $2.55, base, per keg, Pittsburgh, which would have meant $2.65, base, on retailers' or consumers' carloads. The new schedule calls for $2.75, base, and is for retailers' or consumers' carloads. Announcements contain no word as to jobbers' carloads, but it is assumed they will continue to go at 10c. less.

First quarter contracting as a whole has not yet developed much activity or volume. With bars at the same prices for that period as for this quarter, buyers do not seem to see any need for haste. With current buying and specifying on a moderate scale, mill rollings are a little hard to schedule. Ingot production holds pretty close to 80 per cent of capacity, but some recession is likely unless there is an early quickening in the demand for finished products.

Sharon Steel Hoop Co. is maintaining a good operation at its several plants in the district, notably at Sharon, where improvements have permitted not only increased output of hot and cold-rolled strips, but much more efficient operation. The cold strip mills, recently installed, comprising eight stands of cluster mills and 16 stands of two-high mills, now are in full and regular production. The company will begin installation soon of a new continuous hot strip mill and expects to have it in operation by next March. It will be used in rolling widths 12 in. and under. Some consideration was given to a mill for roll-

ing wide strips, but it was finally decided that there already was sufficient wide strip capacity in the country.

The furnace of the Struthers Furnace Co., Struthers, Ohio, is being dried out after its recent relining and it will probably be blown in next Saturday; it will start with a backlog of basic, foundry and malleable grades of more than 25,000 tons, much of the two latter grades being for shipment to western Ohio and Indiana points.

Buffalo

Pig Iron Inquiry Light—Steel Mills Maintain 90 Per Cent Rate—Scrap Market Fairly Steady

BUFFALO, Dec. 11.—Inquiry in the pig iron market during the past week has been light. About 6000 tons has been sold, mostly in 100-ton and smaller lots. Producers believe there is still quite a tonnage to be placed for the first quarter. Prices are firm in the district, although there are some instances of 2X iron from Buffalo going to points eastward for the same price as No. 2 plain. Malleable foundries are considerably busier owing to a revision of policy on the part of some of the automobile makers. One large automobile company is beginning to use more malleable castings. A block of 10,000 tons of iron, which had been held by speculators, and which had been purchased by a producer, has been shipped to the buyer. The Tonawanda Iron Corporation is expected to place its stack in blast toward the end of December.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.00 to $18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations at Buffalo mills are being maintained at about 90 per cent of capacity. First quarter inquiry and specifications are coming in. The bar, shape and plate price is 2.10c., base Buffalo, but in some instances 2.05c. has been done. Sheets are firm at 2.85c. for black, 3.60c. for galvanized, 2.10c. for blue annealed and 4.10c. for automobile body. New hot-rolled strip prices are 2c., base, for 6 in. and under, and 1.90c. base, for wider than 6 in., but some of the larger buyers have been able to obtain as low as 1.90c. and 1.80c., respectively. Structural jobs show an increasing tonnage.

Old Material. — A comparatively small lot of strictly No. 1 heavy melting steel has been sold at $16.50. Dealers expect another mill to come into the market soon for a substantial tonnage. A consumer of No. 1 machinery cast and stove plate, who is about to buy, does not expect to pay over $15 for the cast and $14.50 for the stove plate. Some small sales of No. 1 machinery cast were made during the week at $16, and several small lots of malleable were sold at $16. Dealers report a scarcity of malleable. Sales of knuckles and couplers are reported at $17.50. Machine shop turnings and borings and turnings from the central part of the State are going into Pittsburgh and Youngstown districts. The market appears to be steady; dealers have plenty of orders to fill.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	13.25 to 14.00
Scrap rails	15.50 to 16.00
Hydraul. comp. sheets	13.50 to 14.00
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.00 to 13.75
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	12.50 to 13.00
Acid Open-Hearth Grades	
Knuckles and couplers	17.50 to 18.00
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Bethlehem Sues Corporation on Grey Beam Patents

The Bethlehem Steel Corporation has brought suit in the Federal District Court at Newark, N. J., against the United States Steel Corporation and its subsidiaries, the Carnegie Steel Co. and the American Bridge Co., for $250,000,000 damages for alleged patent infringement and asks for a permanent injunction to restrain the corporation from manufacturing and selling the special structural beams known as Grey beams, to which the Bethlehem Steel Corporation claims exclusive rights.

The Grey patents were originally assigned to the American Universal Mill Co. of New York and then to its successor, the American Universal Mill Co., Scranton, Pa., which is a party to the suit.

The United States Steel Corporation in 1926 began reconstruction of its Carnegie mills at Homestead, Pa., for the rolling of H-sections, and in December of that year the first beam was produced.

Hay Foundry & Iron Works Completes Record Job

The Hay Foundry & Iron Works, Newark, N. J., structural steel fabricator, has recently completed a building job in what is believed to be a record time. On Sept. 17, work was begun on the fabrication of 2200 tons of steel for an apartment building at Madison Avenue and Seventieth Street, New York, and erection was completed on Oct 18. The building is 11 stories high, with 30,000 sq. ft. of floor space, and is being built for the Tishman Realty & Construction Co. The steel work represented the assembly of 9762 pieces of steel and the driving of 36,200 rivets in the field. Owing to the rapidity with which the steel was fabricated and erected, it is expected that the building will be ready for occupancy by May 1, 1929.

McMyler-Interstate Plant to Be Sold at Auction

The plant of the McMyler-Interstate Co., Bedford, Ohio, has been ordered sold under foreclosure proceedings. P. A. Connolly, receiver of the company since April 23, 1928, has been appointed special master to sell the property at public auction. The foreclosure proceedings resulted from an agreement of attorneys for the company and the Union Trust Co., Cleveland, holder of $1,312,793 in McMyler-Interstate bonds secured by mortgage on the property and on which the company had failed to meet the last two interest payments. The chief reason for the receivership was that while assets were far in excess of liabilities the company was in debt in excess of $2,00,000, and lacked money to continue its business. The McMyler-Interstate Co. was engaged in the manufacture of an extensive line of heavy equipment, including locomotive cranes, steam shovels and pile drivers. It also manufactured forgings.

The organization of Lee Wallis Gibbons, 70 East Forty-fifth Street, New York, has been appointed Eastern representative for the Globe Steel Tubes Co., Milwaukee, maker of stainless chromium steel tubes. All other territories are handled by the company's own district sales offices.

Quotations for equipment for chill-casting of cast iron bars are requested by Fabrique Nationale d'Armes de Guerre, Herstal, Belgium.

Non-Ferrous Metal Markets

Copper Quiet But Firm, Tin Active and Lower, Lead and Zinc Sales Light with Quotations Unchanged

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 11	Dec. 10	Dec. 8	Dec. 7	Dec. 6	Dec. 5
Lake copper, New York	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	49.50	50.12½	....	49.95	51.00	51.50
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.35	6.35	6.35	6.35	6.35	6.35
Zinc, New York	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis	6.35	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Dec. 11.

Copper.—Buying by both domestic and foreign consumers has shrunk decidedly, but prices continue very firm. In the past week domestic consumers have been purchasing small quantities for fill-in requirements and also some metal for February delivery. Moderate buying of March metal has also appeared. It is estimated that consumers must still buy considerable metal for February. Foreign consumers have by no means bought the metal they will need for December and for January and February. Electrolytic copper is quoted at 16c., delivered in the Connecticut Valley, and at 16.25c., c.i.f. European ports. Specifications on contract for domestic consumption continue heavy, but thus far there is no prospect of a scarcity, as production is gradually increasing. Lake copper is quiet but firm at 16c. to 16.12½c., delivered.

Tin.—Consumers of Straits tin have been quite active and dealers have also entered the market, so that the total sales of this grade for the week ended Saturday, Dec. 8, were about 1500 tons. Chief interest was in December-January arrivals. The London market has been fluctuating within rather wide limits. On Dec. 7, the market was down over £4 per ton, and yesterday it declined still further, or about £2, with an extreme fluctuation in the East of £9 10s. Today, however, London advanced £1 10s. and the Eastern price recovered £7 15s., so that quotations stood at £227 10s. for spot standard, £225 for future standard and £227 12s. 6d. for spot Straits, all about £12 below the quotations of a week ago. The Singapore market today was £230 5s., also about £12 less than a week ago. The market on this side this week has been moderately active, with spot tin quoted today at 49.50c., New York. Today's market closed weak. The first week on the new National Metal Exchange was active and sales were satisfactory.

Lead.—Demand is not so large as it has been recently, but several good-sized contracts for January-February have been put through in the last day or two. On the whole, the market is quiet with inquiry at St. Louis a little more active than in the East. Prices continue firm and unchanged at 6.35c., St. Louis, with a number of producers practically sold up for December and January. The contract price of the leading interest continues unchanged at 6.50c., New York.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	33.00c. to 34.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	34.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products are unchanged. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10.25c. to 10.50c.

List Prices, per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets)	10.25c. to 10.50c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.
Rods—	
High brass	18.25c.
Naval brass	20.25c.
Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings	9.75c.	10.75c.
Lead, heavy	5.125c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes	28.50c.

Zinc.—Quotations for prime Western zinc are firm at 6.35c., East St. Louis, or 6.70c., New York, for delivery through the first quarter. Buying has slackened decidedly, as might be expected after the heavy purchasing by consumers recently. They still, however, have considerable to buy for the first quarter. Contrary to expectations, the ore price at Joplin was unchanged last week at $40 per ton, although purchases were large at over 14,300 tons, though less than those of the week before. Shipments were slightly in excess of 19,000 tons, but because the output for the week increased only about 200 tons to 12,400 tons, there was a marked reduction in stocks, which are now estimated at about 44,100 tons. Early in November these stocks were about 57,800 tons.

Antimony.—Demand for Chinese metal is less active and quotations are lower at 9.62½c., duty paid, New York, for all positions.

Nickel.—Ingot nickel in wholesale lots for this and next year's delivery is quoted unchanged at 35c., with shot nickel at 36c. Electrolytic nickel is held at 37c. per lb. for this year's delivery, but for 1929 the quotation will be on the same basis as asked for ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Dec. 11.—Prices of tin, copper and antimony are lower. Sales of non-ferrous metals in this market are little changed from a week ago. The old metal market is steady.

Prices, per lb., in carload lots: Lake copper, 16.25c.; tin, 51c.; lead, 6.45c.; zinc, 6.45c.; in less-than-carload lots: antimony, 10.75c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Newton Steel to Increase Sheet Capacity

From proceeds of new financing, the Newton Steel Co., Newton Falls, Ohio, will enlarge its capacity for rolling steel sheets by adding 10 hot mills and auxiliary equipment to the 20 mills which comprise the present plant. At a special meeting Dec. 10, stockholders ratified financing plans, whereby the company expects to raise $1,750,000 for the improvements. The plan calls for an increase in the authorized common stock of no par value from 100,000 to 300,000 shares. Of this increase, 100,000 shares will be used to exchange the present common for new, on the basis of one new for one old. In addition, 40,000 shares will be issued and have been sold at $43.75 per share to a banking syndicate.

Reinforcing Steel

Awards of 4300 Tons—4275 Tons in New Projects

AWARDS of 4300 tons reported during the last week included no jobs of outstanding size. New projects, amounting to 4275 tons, were also of small size, ranging from 100 to 800 tons. Awards follow:

BOSTON, 650 tons, United Shoe Machinery Corporation office building, to Edward A. Tucker Co.

BROOKLYN, 200 tons, Abraham Lincoln High School; from George F. Driscoll Co., general contractor, to Carroll-McCreary Co., Inc.

HACKENSACK, N. J., 500 tons, Pennsylvania Railroad bridge; from Foundation Co., general contractor, to Carroll-McCreary Co., Inc.

LOCKPORT, N. Y., 125 tons, addition to Harrison Radiator Co., to a Buffalo maker.

PITTSBURGH, 400 tons, Arlington apartment building, to Truscon Steel Co.

SOUTH BEND, IND., 120 tons, building for Sears, Roebuck & Co., to Concrete Steel Co.

CHICAGO, 300 tons rail steel bars, Northwest Lyons Club, to Calumet Steel Co.

CHICAGO, 150 tons, Harrington warehouse, to Concrete Engineering Co.

ST. LOUIS, 300 tons, Deaconess Hospital, to Laclede Steel Co.

NORTH LITTLE ROCK, ARK., 300 tons, high school, to Sheffield Steel Corporation.

STARKVILLE, MISS., 230 tons, several buildings for Agricultural and Mechanical College of Mississippi, to Connors Steel Co.

SAN FRANCISCO, 100 tons, Magnin's store, to Gunn, Carle & Co.

SAN FRANCISCO, 100 tons, two apartment buildings, Broadway and Octavia Street, to W. S. Wetenhall Co.

SAN FRANCISCO, 131 tons, Bekins storage warehouse, to Gunn, Carle & Co.

OAKLAND, CAL., 248 tons, South spillway, East Bay municipal utility district, to Pacific Coast Steel Co.

OAKLAND, 173 tons, Jackson Creek spillway and Pardee Reservoir, East Bay municipal utility district, to Soule Steel Co.

RENTON, WASH., 300 tons, power house for Puget Sound Power & Light Co., to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 170 tons, Massachusetts General Hospital addition.

NEW YORK, 750 tons, sections 1 and 2, route 103, Houston Street subway; bids Dec. 28.

RICHMOND HILL, N. Y., 175 tons, telephone building; White Construction Co., general contractor.

NEWARK, 800 tons, manufacturing building for Hoffman Beverage Co.

KEARNY, N. J., 225 tons, manufacturing building for Western Electric Co., Inc.

HACKENSACK, N. J., 275 tons, Pennsylvania Railroad bridge; Triest Contracting Corporation, general contractor.

CHAMPAIGN, ILL., 100 tons, Mantino State Hospital; English Brothers, low bidders on general contract.

CHICAGO, 300 tons, La Salle Club; K. M. Vitzhum, architect.

CHICAGO, tonnage being estimated, office building at 1 N. La Salle Street; John Griffiths Co., general contractor.

HOUSTON, TEX., 700 tons, building for Sears, Roebuck & Co., B. W. Construction Co., Chicago, general contractor.

BELLINGHAM, WASH., 100 tons, building for Washington Cooperative Egg & Poultry Association; bids being taken.

NEWPORT BEACH, CAL., 113 tons, two bridges; bids Dec. 17.

FAIRFAX, CAL., 310 tons, hotel, bids being taken.

SAN FRANCISCO, 355 tons, Rest Home for Christian Science Church; bids opened.

Forms Non-Ferrous Ingot Committee

A special committee of the American Society for Testing Materials to promote the general use of specifications for copper alloys in ingot form held a meeting in Cleveland late in November and organized. The chairman of the committee is Guilliam H. Clamer, president Ajax Metal Co., Philadelphia.

The committee was appointed to undertake the solving of problems arising from the publication in technical and trade journals of prices of ingot metals which, it is stated, make no allowance for grade of material used, varying percentages of impurities or the tolerances permitted in composition. The following plan of action was decided upon by the committee:

1. To enlist the cooperation of the Non-Ferrous Ingot Metal Institute in educating consumers to standard alloys, standard requirements and specifications with as few variations as possible from these standards.

2. To obtain all possible specifications from consumers and producers of ingot copper alloys. These specifications will be compiled and tabulated, and as soon as possible a standard specification will be submitted to the proper committee of the A. S. T. M. with the recommendation that this be put through the regular procedure for the development of the standards.

C. L. Warwick, secretary-treasurer of the A. S. T. M., was made secretary of the new committee.

Pressed Metal Institute to Meet at Detroit

The December meeting of the Pressed Metal Institute will be held in Room 20-221 General Motors Building, Detroit, on Dec. 19. The morning sessions will consist of group meetings, the light stampings and heavy stampings groups meeting separately, while at the afternoon session both groups will meet as the Pressed Metal Institute. The members of the institute and other stamping manufacturers will be the guests of the Purchasing Agents' Association of Detroit, at dinner at 6.30, following which W. W. Galbreath, president Youngstown Pressed Steel Co., Youngstown, and also president of the Pressed Metal Institute, will speak on "Today's Problems and Today's Purchasing Agent."

PERSONAL

JOHN J. OTT, president and general manager B. Ott & Sons Co., LaCrosse, Wis., machine shop, severed his connections with the concern on Dec. 1 and will retire from active business. Mr. Ott served his apprenticeship as a machinist in what now are the Allis-Chalmers Mfg. Co. and Vilter Mfg. Co., Milwaukee, returning to LaCrosse in 1893 to become superintendent of his father's plant. He became president, upon the death of his father, Benedict Ott, in 1905.

—

J. MURRAY RIDDELL is now associated with Crowell & Murray, Inc., Perry-Payne Building, Cleveland, consulting mining engineer, chemist, assayer and metallurgist. For the past 10 years he has been employed by the Corrigan, McKinney Steel Co., Cleveland, as reporting engineer, assistant district superintendent of its Menominee Range iron ore mines and general superintendent of its Kentucky coal mines. He is a graduate of the Michigan College of Mines.

—

HARRY A. PRATT, purchasing agent Wilcox-Crittendon Co., Middletown, Conn., has been made assistant general manager. James O. Lord succeeds him as purchasing agent, and Henry Hanson has been made plant manager.

—

EARL R. STEWART, formerly president and general sales manager of the North Western Expanded Metal Co., has been made a member of the firm of the Dillaby Fireproofing Co., Boston.

—

H. B. KNOWLTON, metallurgist International Harvester Co., Fort Wayne, Ind., addressed the Indianapolis chapter of the American Society for Steel Treating on Dec. 10, his subject being "Steel Failures and How to Produce Them."

—

W. C. MACFARLANE, president of the Minneapolis Steel & Machinery Co., has been elected president of the Manufacturers' Association of Minneapolis. Other officers elected were S. V. Wood, president Minneapolis Electric Steel Castings Co., first vice-president; R. G. Mitchell, vice-president Dodson-Fisher Co., second vice-president; C. B. Mills, president Midland National Bank & Trust Co., treasurer, and Alexis Caswell, secretary and business manager.

—

ARTHUR J. TUSCANY, manager of the Gray Iron Institute, Cleveland, was recently presented with a marble and gold desk set by the Ohio Foundries Association, Inc., of which he was secretary and manager for nearly seven years prior to his connection with the Gray Iron Institute. The presentation was made by C. C. SMITH, Toledo Castings Co., Toledo, Ohio, president of the Ohio Foundries Association.

—

H. M. REED, who has been vice-president and general manager of factories for the Standard Sanitary Mfg. Co., Pittsburgh, has been named first vice-president and chairman of the executive committee, succeeding the late J. W. Oliver. THEODORE E. MULLER succeeds Mr. Reed. R. E. SARGENT, general sales manager, has been elected vice-president and a director. F. F. KAULBACH also is a new director of the company.

SAM TOUR

SAM TOUR, who resigned as metallurgist, Doehler Die Casting Co., several months ago, has established an office as consulting engineer at 123 North Street, Batavia, N. Y. He will devote attention to problems in die casting and heat treating (especially in salt baths). He is a graduate of University of Colorado, and received the degree of Master of Science from the University of Michigan. During the war and until 1921 he was attached to the Army Ordnance Department. Since 1921, as metallurgist for the Doehler company, he has discovered die steels of great serviceability and has pioneered in producing castings of high zinc content, with zinc of unusual purity. He has written and lectured widely on the salt bath method of heat treating and furnaces therefor. Mr. Tour has been chairman of both the Washington and New York chapters of the American Society for Steel Treating; is a member of the executive committee of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, and is secretary of the Committee on Corrosion of Non-ferrous Metals and Alloys of the American Society for Testing Materials.

—

L. B. GODFREY has been appointed Eastern sales manager for the Cuyahoga Steel & Wire Co., Cleveland, and will have offices at 70 North Beacon Street, Hartford, Conn. For the past 10 years he has been associated with the machine tool industry.

—

F. WARD COBURN has been elected a director of the E. & G. Brooke Iron Co., Birdsboro, Pa.

—

CALVIN E. BRODHEAD, formerly vice-president Scranton Bolt & Nut Co., Scranton, Pa., has been placed in charge of a sales office which has been opened at 393 Seventh Avenue, New York, by the Wrought Iron Co. of America, recently formed by a merger of the Lebanon Iron Co., Lebanon, Pa., and the Scranton company.

—

CHARLES A. LAMPARD has been appointed special sales representative in New England for the Poldi Steel Corporation of America, 245 West Eighteenth Street, New York. He was previously in charge of metallurgical work for the Yale & Towne Mfg. Co., Stamford, Conn., and also was for a time in charge of the heat treating departments of the Union Metallic Cartridge Co., Bridgeport, Conn., and furnace and metallurgical specialist for the General Electric Co., Schenectady, N. Y.

—

WALTER J. DONNELLY, trade commissioner at Montreal for the Department of Commerce, has been promoted to the position of commercial attaché at Bogota, Colombia.

—

REAR ADMIRAL W. A. MOFFETT, chief of the Navy Bureau of Aeronautics, was the guest of honor at a dinner given by the Detroit Aviation Society, Dec. 5. He predicted a bright future along commercial lines for lighter than air machines and added that, while the dirigible will eventually play an important part in transportation to Europe, its most fertile field now is between North and South America, where ideal weather conditions prevail all year around on the airways between the two continents.

New Direct Steel Process of W. H. Smith

A process for making sponge iron, or steel, direct from the ore "without the use of coal or coke," has been under development in the past few years by William H. Smith, Detroit, but nothing authentic regarding it has been obtainable. Mr. Smith, who was connected at one time with the Ford Motor Co., as head of its research department, has been perfecting his process through work at the University of Detroit, and at a small commercial plant located near Detroit. The company organized to handle the process is the General Reduction Corporation, which, it is emphasized, is not owned by Henry Ford or the General Motors interests. Rights to use the process have been leased to the Ford Motor Co. and negotiation are under way for use of the process in certain foreign countries.

Railroad Equipment

Missouri Pacific Will Buy 3000 Freight and 40 Passenger Cars—Lehigh Valley Inquires for 1000 Cars

NEW inquiries for freight cars which have come out during the week total nearly 5000, the largest being 3000 for the Missouri Pacific, 1000 for the Lehigh Valley and 500 for the Chicago Great Western. The Missouri Pacific will also buy 40 passenger train cars and 25 switching locomotives. The Chicago & North Western has ordered 200 ballast cars, and the Seaboard Air Line, 200 hopper cars. Details of the week's business follow:

Missouri Pacific has issued inquiries for 1000 50-ton box cars, 750 40-ton and 250 50-ton automobile cars, 500 70-ton hopper cars, 500 40-ton stock cars, 60 caboose cars and 20 air-dump cars. Road is also inquiring for 25 eight-wheel switching locomotives and 40 passenger train cars, including 13 mail and baggage, 12 baggage, 11 passenger coaches, one cafe club coach and two cafe lounge coaches.

Chicago & North Western has ordered 200 ballast cars from Rodger Ballast Car Co. and has made inquiry for 10 4-8-4 type locomotives.

Seaboard Air Line has ordered 200 70-ton hopper cars from Richmond Car Works.

Youngstown Sheet & Tube Co. has ordered 17 air-dump cars of 35-cu. yd. capacity from Koppel Industrial Car & Equipment Co.

Amtorg Trading Corporation, New York, has ordered 20 air-dump cars from Magor Car Co.

New York Central is inquiring for 100 70-ton, high-side gondola cars.

Chicago Great Western is inquiring for 300 automobile cars and 200 box cars.

Lehigh Valley has made inquiry for 500 50-ton hopper cars, 300 50-ton automobile cars and 200 70-ton gondola cars.

Utah Copper Co. is asking for bids on 100 90-ton ore cars and 20 air-dump cars.

Fruit Growers Express has made inquiry for 800 underframes for refrigerator cars in addition to 200 previously mentioned.

Louisville & Nashville has made formal inquiry for 2500 freight cars previously reported as authorized.

Atchison, Topeka & Santa Fe's total inquiries now include 4575 freight cars and 56 passenger cars. This road has placed two dining cars with Pullman Car & Mfg. Corporation and is also inquiring for 21 gas-electric rail-motor cars.

Chicago, Rock Island & Pacific is in market for six gas-electric cars.

Fabricated Structural Steel

New York Subway Will Take 34,000 Tons and Government Building at Washington, 10,000 Tons—Awards of 29,400 Tons

WITH two sections of the New York subway calling for a total of 34,000 tons, and a Government building at Washington for 10,000 tons, new projects reported during the week totaled 58,300 tons. Awards amounted to 29,400 tons, the largest having been 6000 tons for a telephone building at Cincinnati and 5200 tons for a loft building in New York. Awards follow:

NEW YORK, 5200 tons, loft building at Seventh Avenue and Thirty-ninth Street, to Hay Foundry & Iron Works.

NEW YORK, 1300 tons, apartment building at 144 West Eighty-sixth Street, to Easton Structural Steel Co.

NEW YORK, 1000 tons, public school No. 92, to Hay Foundry & Iron Works.

NEW YORK, 900 tons, apartment building at 4 East Seventy-second Street, to Hay Foundry & Iron Works.

NEW YORK, 600 tons, apartment building at Twelfth Street and Fifth Avenue, to Dreier Iron Works.

BALTIMORE & OHIO RAILROAD, 200 tons, bridge, to Fort Pitt Bridge Co.

PARR, S. C., 115 tons, turbine supports bought by W. S. Barstow Management Associates, Reading, Pa., from unnamed builder.

LOUISVILLE & NASHVILLE RAILROAD, 800 tons, bridge construction at Birmingham, to Nashville Bridge Co.

NIAGARA FALLS, N. Y., 800 tons, office building, to McClintic-Marshall Co.

NIAGARA FALLS, 187 tons, addition to National Carbon Co. plant, to R. S. McMannus Steel Corporation.

BUFFALO, 370 tons, reception building for Buffalo State Hospital, to Kellogg Structural Steel Co.

BUFFALO, 300 tons, coach shop for New York Central Railroad, to Kellogg Structural Steel Co.

WASHINGTON, PA., 150 tons, Y. W. C. A. building, to Guibert Steel Co.

FLINT, MICH., 825 tons, Industrial Mutual Association auditorium, to American Bridge Co.

DETROIT, TOLEDO & IRONTON RAILROAD, 446 tons, bridge at Delta, Ohio, to McClintic-Marshall Co.

TOLEDO, OHIO, 495 tons, New York Central Railroad bridge, to McClintic-Marshall Co.

CLEVELAND, 290 tons, West 117th Street viaduct for New York Central Railroad, to unnamed fabricator.

CLEVELAND, 1250 tons, addition to Moreland Courts Apartments for Shaker Co., to McClintic-Marshall Co.

CLEVELAND, 200 tons, East Thirty-seventh Street bridge for Cleveland Union Terminals Co., to Bethlehem Steel Co.

CINCINNATI, 6000 tons, building for Cincinnati and Suburban Bell Telephone Co., to American Bridge Co.

CINCINNATI, 2000 tons, building for Union Gas & Electric Co., to American Bridge Co.

MICHIGAN CENTRAL RAILROAD, 400 tons, bridges in Indiana, to McClintic-Marshall Co.

CHICAGO, 250 tons, gymnasium for University of Chicago, to an unnamed bidder.

CHICAGO, 1300 tons, armory for 124th Field Artillery, to Mississippi Valley Structural Steel Co.

CHICAGO, 500 tons, addition to Washington Park race track, to United Boiler, Heating & Foundry Co.

MILWAUKEE, 700 tons, building for Allis-Chalmers Mfg. Co., to American Bridge Co.

ST. JOSEPH, MO., 500 tons, bins and sheds for Quaker Oats Co., to St. Joseph Structural Steel Co.

ROSITA, MEX., 1000 tons, buildings for American Smelting & Refining Co., to Ingalls Iron Works.

PARADISE, MONT., 570 tons, Clarks Fork bridge, to Virginia Bridge & Iron Co.

SAN FRANCISCO, 150 tons, Grace Cathedral, to Judson-Pacific Co.

SAN JOSE, CAL., 100 tons, market building, to Golden Gate Iron Works.

SANTA MONICA, CAL., 190 tons, Outlook Building, to Baker Iron Works.

SEATTLE, 200 tons, addition for Isaacson Iron Works, to be fabricated in company's own shop.

STATE OF WASHINGTON, 700 tons, power plant for Stone & Webster, to Pacific Coast fabricator.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARTFORD, CONN., 150 tons, building for Trinity College.

NEW YORK, 300 tons, Home for Aged on East Eighty-eighth Street.

NEW YORK, 15,000 tons, section No. 1, route 103 of subway for Houston Street line; bids Dec. 28.

NEW YORK, 19,000 tons, section No. 2, route 3 of subway for Houston Street line; bids Dec. 28.

BROOKLYN, 1000 tons, Pitkin Theater; Thompson-Starrett Co., contractor.

STATE OF NEW YORK, 150 tons, Neversink River highway bridge.

YONKERS, N. Y., 450 tons, showroom and service station.

READING RAILROAD, 6000 tons, steel superstructure for viaduct and bridges for Manayunk grade crossing elimination.

BALTIMORE, 600 tons, highway bridge.

WASHINGTON, 10,000 tons, Internal Revenue Building.

ERIE, PA., 200 tons, Jewish Temple.

SPRINGFIELD, ILL., 1500 tons, State highway bridges.

CHICAGO, 18,500 tons, Board of Trade Building; previously estimated at 15,000 tons.

CHICAGO, tonnage not stated, office building for Swift & Co.

KANKAKEE, ILL., 187 tons, Arcade Building.

SAN RAFAEL, CAL., 250 tons plates, steel tank for Marin municipal water district; bids Dec. 18.

The Timken Roller Bearing Co., Canton, Ohio, has established offices at 1361 Figueroa Street, Los Angeles, and 321 South Pine Street, Seattle, Wash., the former in charge of Roy Cross and the latter of Marshall Cooledge.

Manufacturing operations in motor car and truck factories is continuing at approximately the November rate with some tendency to increase as a larger number of companies swing into production of 1929 models, says *Automotive Industries* this week.

Lower Prices for European Steel

Rapid Resumption of German Mills After Lockout Relieves Tension —British Pig Iron Demand Better

(*By Cablegram*)

LONDON, ENGLAND, Dec. 10.

DEMAND for Cleveland pig iron is maintained by domestic consumers asking prompt delivery and some furnaces cannot accept any more orders for delivery this year. Export inquiry is still poor, but prices are firm. In Scotland three Gartsherrie blast furnaces have been blown out, reducing the number of active Scottish furnaces to 20.

East-Coast hematite is moderately active, with stocks small. Prices are being maintained for domestic use, but export buyers are receiving concessions. Foreign ore markets are quiet.

Finished iron and steel business is quiet in the heavy industries, but shipbuilders now are placing many more ship orders, which eventually will benefit the steel makers. The position otherwise is unchanged and little revival is expected this year.

Tin plate demand has improved, but business generally is quiet. Most makers are well sold for the early months of next year and the position to the end of the current year is being eased by the stoppage weeks, being run off by certain works which are short of immediate specifications.

Galvanized sheet markets are fairly active in small parcels and makers generally are well placed up to January or February. Black sheets are quiet.

On the Continent of Europe

Continental markets are quiet and prices easing, as German production is resumed.

French production in October included 857,000 metric tons of pig iron and 834,000 tons of raw steel (ingots and castings).

Belgian Mills Grant Concessions

Prices for First Quarter Delivery Shaded—British Sheets and Foundry Iron Being Imported

ANTWERP, BELGIUM, Nov. 23.—The lockout at the German steel mills failed to bring an increase of business to Belgian mills, which are offering prompt delivery on most products. For future delivery, buyers are pressing for lower prices, and a tendency to offer concessions on first quarter tonnage is evident. Exporters with orders for future shipments are inclined to delay buying, apparently believing that the present willingness to make concessions presages a lower market level for early 1929. Mills, however, are booked with sufficient tonnage to carry them through January and are not disposed to offer marked price reductions. Another factor favorable to the mills is the active demand for steel from foreign markets, which will not permit exporters to delay placing their orders for long.

Although the German lockout did not cause an appreciable increase in business, it undoubtedly diverted some business to Belgian mills from foreign buyers who were unable to secure early shipments from Germany.

The market on steel bars is somewhat irregular, as only certain mills are in need of tonnage and in most cases will accept only a limited number of sizes. This necessitates distributing a miscellaneous specification for bars to two or more makers. Prices for export range from £6 3s. to £6 4s. per ton (1.36c. to 1.37c. per lb.) for large orders and from £6 5s. to £6 6s. per ton (1.38c. to 1.39c. per lb.) for small lots and prompt delivery. Most mills are offering January-March shipment.

Corrugated reinforcing bars are quoted at £6 6s. per ton (1.39c. per lb.), and angles are slightly softer, ranging from £5 12s. per ton (1.24c. per lb.) for larger sizes to £6 2s. 6d. per ton (1.35c. per lb.) for small sizes. Hot-rolled hoops are quoted at £6 5s. per ton (1.38c. per lb.), f.o.b. Antwerp. The sheet market is quiet, but heavy gages of black sheets are firm. The light gages continue to encoun-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd	£0 17½s.			$4.24	
Bilbao Rubio ore*	1 2	to £1	2½s.	5.34 to	$5.46
Cleveland No. 1 foundry	3 8½	to 3	9½	16.61 to	16.85
Cleveland No. 3 foundry	3 6			16.00	
Cleveland No. 4 foundry	3 5			15.76	
Cleveland No. 4 forge	3 4½			15.64	
Cleveland basic (nom.)	3 5			15.76	
East Coast mixed	3 10	to 3	11	16.98 to	17.22
East Coast hematite	3 10½	to 3	11½	17.10 to	17.34
Rails, 60 lb. and up	7 15	to 8	5	37.59 to	40.01
Billets	6 5	to 6	10	30.31 to	31.53
Ferromanganese	13 15			66.69	
Ferromanganese (export)	14 0			67.90	
Sheet and tin plate bars, Welsh	6 0			29.10	
Tin plate, base box	0 18	to 0	18⅛	4.37 to	4.39
Black sheets, Japanese specifications	13 7½			64.87	
				C. per Lb.	
Ship plates	7 12½	to 8	2½	1.66 to	1.76
Boiler plates	9 0	to 10	10	1.95 to	2.27
Tees	8 2½	to 8	12½	1.76 to	1.86
Channels	7 7½	to 7	17½	1.60 to	1.71
Beams	7 2½	to 7	12½	1.55 to	1.65
Round bars, ¾ to 3 in.	7 10	to 8	0	1.63 to	1.73
Steel hoops	9 0	to 10	0	1.95 to	2.16
Black sheets, 24 gage	10 0			2.16	
Galv. sheets, 24 gage	13 10	to 13	15	2.93 to	2.98
Cold rolled steel strip, 20 gage (nom.)	16 0			3.47	

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):					
Belgium	£3 3½s.	to £3	6s.	$15.39 to	$16.00
France	3 3½	to 3	6	15.39 to	16.00
Luxemburg	3 3½	to 3	6	15.39 to	16.00
Basic pig iron (a):					
Belgium	3 4½	to 3	5½	15.64 to	15.88
France	3 4½	to 3	5½	15.64 to	15.88
Luxemburg	3 4½	to 3	5½	15.64 to	15.88
Coke	0 18			4.37	
Billets:					
Belgium	5 1½			24.61	
France	5 1½			24.61	
Merchant bars:				C. per Lb.	
Belgium	6 2½			1.33	
France	6 2½			1.33	
Luxemburg	6 2½			1.33	
Joists (beams):					
Belgium	5 2½			1.11	
France	5 2½			1.11	
Luxemburg	5 2½			1.11	
Angles:					
Belgium	6 1½			1.32	
¼-in. plate:					
Belgium (a)	6 12			1.43	
Germany (a)	6 12			1.43	
⅜-in. ship plate:					
Belgium	6 7			1.38	
Luxemburg	6 7			1.38	
Sheets, heavy:					
Belgium	6 1			1.31	
Germany	6 1			1.31	

(a) Nominal.

ter keen competition from the British product.

Semi-finished material prices are firm, but transactions are few because of limited stocks. The scarcity of blooms has become acute since the German mills withdrew from the market, as previous to the lockout they were practically the only sellers. There is also a scarcity of billets, and prices are nominally £4 19s. to £5 3s. ($24.06 to $25.03) per metric ton. Sheet bars are steady in price, but the market is quiet. Transactions are usually at about £5 2s. per ton ($24.79) for normal specifications.

The export price of No. 3 phosphoric foundry iron continues at 118 Belgas ($16.40) per metric ton in the domestic market and £3 5s. to £3 6s. ($15.80 to $16.04) per ton, f.o.b. Antwerp for export. British Midland furnaces are offering foundry iron at about £3 6s. per ton, c.i.f. Antwerp, or about 116 Belgas ($16.04), and are securing considerable tonnage from consumers not far removed from the port. Scrap iron and steel prices are firm at 105 Belgas ($14.60) per metric ton for furnace grade, 104 Belgas ($14.26) per ton for heavy melting steel for open-hearth and 128 Belgas ($17.80) per ton for No. 1 cast.

German Tin Plate Output Increasing

HAMBURG, GERMANY, Nov. 23.—German output of tin plate was 13,259 metric tons, or 292,228 base boxes, in October, compared with 11,001 metric tons, or 242,462 base boxes, in the same month of 1927. The October production of tin plate established a new record and is explained in part by an increase in business with British merchants following the Welsh-American tin plate agreement. It is claimed that November would have shown a further increase in tin plate output but for the lockout. The Hoesch Steel Co. plans to increase its tin plate capacity by about 3000 tons, or 66,120 base boxes a month, because of its larger export trade.

German Works Seek South African Ore

HAMBURG, GERMANY, Nov. 24.—Considerable interest in South African manganese ore is being shown by Friedrich Krupp A. G., Essen, and Gutehoffnungshütte, Oberhausen, whose combined imports of manganese ore are about 120,000 tons annually. Both companies are interested in the Gloucester Mining Co., Postmasburg, South Africa, which controls manganese mines. With the completion of a railroad from the mines to the sea, it is planned to ship equipment and give engineering assistance to develop the fields.

Phillips Brothers, Philadelphia, iron and steel importers and jobbers, have moved their offices to the Middle City Building, 34 South Seventeenth Street, that city.

Prices of Imported Steel Recede

Quotations Still Too High for Sales Here—Hearing This Month on Steel Marking

NEW YORK, Dec. 11.—Prices on foreign bars and shapes, c.i.f. Atlantic ports, have registered a slight decline in the past week, following termination of the lockout at German steel mills. The reductions in quotations, however, have only amounted to 1.50c. to 2c. per 100 lb., so that the market is still too high to permit much business with American consumers. Shapes range in price from 1.83c. to 1.85c. per lb., and plain steel bars from 1.95c. to 2c. per lb., duty paid.

The recent decision of the Customs Court of Appeals upholding the lower court in classifying reinforcing bars as structural material, at 10c. per 100 lb. lower duty, has not yet resulted in any competitive offers by importers of Continental material. On a recent inquiry for a sizable tonnage of reinforcing bars, an importer bid about 2.05c. per lb. and the business was placed with a domestic mill quoting $1.20 per ton higher. Another importer recently offered reinforcing bars on an inquiry for 1000 tons at 2c. per lb., duty paid, but did not receive the business.

Despite the order of the Treasury Department, classifying bar-sized shapes under the bar paragraph of the tariff, taking a 10c. per 100 lb. higher duty than when classified as structural material, importation of furring channels continues, although on a smaller scale. The new classification imposes a duty of 30c. per 100 lb. on furring channels, which cost more than 1.50c. per lb. After the Treasury Department issued its order on bar-sized shapes, domestic manufacturers of furring channels advanced their prices 10c. per 100 lb. to a range of 2.75c. to 2.80c. per lb., but Continental makers have evidently absorbed part of the increased tariff and are meeting the domestic price in most cases.

Importers have entered a protest against the ruling of the Treasury Department on bar-sized shapes, but no date for a hearing has been set.

Several cases of domestic mills against inporters intended to clarify the Treasury Department ruling on the marking of imported steel are scheduled for hearing before the Customs Court, New York district, Dec. 18 and 19. It is expected by importers that one such case will be selected as a test. The domestic mills are seeking to determine what products must be marked with the country of origin and how the marking is to be applied.

Export business with the Far East shows some evidence of improvement, but merchant buying continues light, especially from Japan. It is pointed out by Japanese trading companies here that merchants are permitting their stocks to decline because they expect the Government to lift the gold embargo early in the coming year. The resulting increase in the exchange value of the yen would leave them with stocks bought when the yen was low. Consumers, however, are in need of material and are beginning to issue inquiries to the importers. A substantial volume of inquiry for rails is in the market from Japan. The Kongosan Railroad in Chosen is inquiring for 12½ miles of 75-lb. rails, with an alternate inquiry for 60-lb. sections; the Shizuoka Railroad is in the market for five miles of 75-lb. rails, with an alternate inquiry for 60-lb. sections, and two privately owned railroads are asking for rail tonnages, one for 100 miles and the other for 60 miles of 60-lb. rails.

American Machines Bought in Germany

Good Market for Specialized Equipment, But Sellers Must Grant One to Three Months' Credit

A STATEMENT of trade conditions in Germany as they affect the American exporter and manufacturer is given in a communication from John E. Kehl, the United States consul at Stuttgart, to the Merchants Association of New York. The letter says, in part:

"In case you should wish to inform your members as to trade possibilities in the Stuttgart consular district, you may state, on the authority of information from this consulate, that there is a good demand here for articles of all kinds involving or expressing new ideas in design, or for filling purposes not previously fulfilled. The Germans are very quick to appreciate the merits of something new in the market, something which accomplishes a purpose not previously met or which is an improvement over articles of like kind. This is especially true of machinery and automotive equipment which embodies new ideas in design or efficiency.

"The German manufacturers of machinery are usually able to produce their machines more cheaply than American machines of similar kind can be delivered in this district. However, the great interest manifested in Germany in the highest possible degree of mechanization of industry makes the German market particularly receptive to offers of any kind of machines that will do something for which there are no German machines available, or which will do the work better or faster or more cheaply

than any German machine. This is especially true in the wood-working and metal-working branches. To a certain extent it is true in the textile industry, which is highly important in this district. The Daimler Motor Works at Stuttgart-Undertuerkheim has perhaps 20 or 30 large and expensive machines imported from the United States. A considerable number of knitting mills in Württemberg and Baden have American machines.

"The general practice in sales of goods in Germany is for the dealer to receive from the manufacturer from 30 to 90 days' credit without interest and a discount of 2 to 4 per cent if he pays within 10 to 30 days. These terms are somewhat more lenient than American manufacturers are accustomed to giving. It often happens, therefore, that prospective German customers lose interest in American offers when they find that they must pay cash against documents in the United States for any goods they buy. This means for them paying for goods about 30 days in advance of receipt. Where it is possible for American exporters to offer terms in compliance with the practice in Germany it will be advisable for them to do so. It is all very well to insist on prompt payments or short credits in a market which is accustomed to it, but when the same insistence is used in approaching merchants in a territory like this, where long credits are the usual rather than the exceptional thing, there is a great danger that the foreign merchant will take this insistence as a reflection on his good standing. There is also a strong possibility that such insistence will end all likelihood of doing business with him."

French Pig Iron Entente To Be Renewed

WASHINGTON, Dec. 11.—It is reported that the entente composed of the several producers of phosphorus pig iron in France, which was to expire Dec. 31, is to be renewed for two years under unchanged terms, according to a cablegram received by the Department of Commerce from Commercial Attaché H. C. MacLean, Paris.

It has also been reported that the international phosphorus pig iron entente, embracing producers in France, Belgium and Luxemburg, will, in all probability, be renewed for a similar period.

Henry Ford has purchased machine shop and business of Charles E. Angell, 223 Aborn Street, Providence, R. I., and will install some of the equipment and records of the Providence firm in his museum of varied Americana at Dearborn, Mich. The shop is probably one of the oldest in New England, but was of particular value to Mr. Ford because of early records pertaining to motive power engine parts which were made by Mr. Angell.

New Arbitrator in German Dispute

Minister of Interior Accepted by Both Factions—Mills Rapidly Resuming Operations

TERMINATION of the lockout in the Ruhr steel mills did not settle the questions at issue; it merely indicated that both the mills and the unions again accepted Government arbitration. The original decision of the Government arbitrators granted an increase of 6 pf. (1.50c.) per hr. to time workers and 2 pf. (0.50c.) per hr. as a "time supplement" to piece workers. The mills refused to accept this finding, contending that it was invalid, as it did not come from a properly constituted authority. The mills were upheld by the courts, and the lockout did not come to an end until Dec. 3, following the appointment of Minister of the Interior Severing as the new arbitrator and his acceptance by both sides. A decision by the new arbitrator is not expected for at least one week, and a number of weeks may elapse before his investigation is completed.

According to a cabled report to the Department of Commerce from Commercial Attaché Fayette W. Allport, Berlin, the Federal Labor Court will, at a later date, bring in a verdict as to the legality of the decision of Minister of Labor Wissell, who, on Oct. 31, held that the wage awards that precipitated the lockout were binding on both parties.

The German steel industry is rapidly resuming activity. About four-fifths of the mills affected by the lockout are operating, more men are being employed daily, and new furnaces are being started. The resumption of production has affected Continental steel prices. The trend of export prices is downward, after a slight advance during November when the lockout was effective. It is reported that the volume of orders on the books of German steel works is sufficient to sustain operations for the next three months.

Neither the mills nor the unions have changed their attitude regarding the issues that caused the lockout. Employers continue to protest that they wish to avoid a new advance in prices, which would be the third this year in the domestic market, and that a wage increase would make such an advance inevitable. The average wage of skilled workers in the metal industries is 48.89 m. ($11.65) per week. This is the minimum, as most steel workers receive extra payments, if married, or for overtime work. The increase in wages of 15 pf. (4c.) per hr. originally demanded by the unions would cost the metal industry about 90,000,000 m. ($21,438,000) a year.

Annual reports of leading mills, however, do not substantiate the employers' claim that their finances are unsatisfactory and that they are unable to pay an increase with their present income. The turnover of business at the Gutehoffnungshütte at Oberhausen increased 10 per cent in 1927, but its gross profits increased 25 per cent. Other corporation reports also show satisfactory financial conditions. The average dividend of the heavy iron and steel corporations is slightly higher than the average for all corporations in Germany.

World Engineering Congress Plans Outlined

The World Engineering Congress, to be held in Tokio, Japan, next year, was given a decided impetus by a dinner meeting of the American committee on Dec. 6 at the Engineers' Club, New York, at which Dr. Masawo Kamo, professor of mechanical engineering at Tokio Imperial University, was the guest of honor. Doctor Kamo, who is chairman of the organizing committee of the congress, told in detail what is being arranged for the entertainment and comfort of visitors and outlined active participation of some principal countries of Europe.

It was, however, in the reports of the chairman of the American subcommittees that the information became available as to the growing interest being shown within the United States toward the congress and the numbers who are planning to participate. Among those committees reporting were: Finance, John W. Lieb, chairman; publicity, James H. McGraw, chairman; transportation, F. B. Jewett, chairman; promotion and attendance, George W. Fuller, chairman. Elmer A. Sperry, chairman of the American committee and now president of the American Society of Mechanical Engineers, presided, and details were also explained by Maurice Holland, executive secretary of the committee, 29 West Thirty-ninth Street, New York. The American Express Travel Bureau will have charge of the arrangements and one of the Dollar Line steamships leaving San Francisco has been chartered.

Manitowoc Ship Building Corporation, Manitowoc, Wis., has been given a contract by the Pere Marquette Railroad to construct two new car ferries at a cost of $2,500,000. The new ferries will be the first on the Great Lakes to employ turbo-electric drive. It will make them the fastest ferries and among the fastest ships on the Lakes, with a speed of 18 miles an hour specified.

The turntable of permanent molds shown on page 1223 of THE IRON AGE of Nov. 15, in an article devoted to the manufacture of electric heating appliances by the Edison Electric Appliance Co., Chicago, carried molds made by the Holley Permanent Mold Machine, Inc., Detroit.

Working on Small Tool Standardization

Progress was reported by 12 technical committees and new projects were discussed at a meeting of the sectional committee on the standardization of small tools and machine tool elements, which was held Dec. 6 at the Engineering Societies Building, New York. The sectional committee is organized under the procedure of the American Standards Association, and is sponsored by the National Machine Tool Builders Association, Society of Automotive Engineers and the American Society of Mechanical Engineers.

H. E. Harris, consulting engineer, Bridgeport, Conn., chairman of the committee, presided at the meeting, which was well attended. Brief addresses, dealing for the most part with the desirability of the standardization projects in hand, were made by J. B. Armitage, chief engineer Kearney & Trecker Corporation, Milwaukee, representing the N. M. T. B. A.; D. W. Oviatt, chairman of tool standards committee, General Motors Corporation, representing the S. A. E.; and J. R. Shea, superintendent of manufacturing development, Western Electric Co., New York, representing the A. S. M. E.

Technical committee No. 1 has completed its work, standards for T-slots, their bolts, nuts, tongues and cutters having been approved March, 1927. Tool holder shanks and tool post opening standards have passed the sectional committee and sponsor organizations and are now before the American Standards Association. The preliminary work of the milling cutter committee, which is made up of eight sub-committees headed by C. W. Machon, Brown & Sharpe Mfg. Co., Providence, has been practically completed.

Progress in Taper Shank Standards

Standardization of machine taper shanks and sockets, an outstanding project, has made considerable progress. This committee, headed by E. F. DuBrul, general manager of the National Machine Tool Builders Association, is in a position to submit two propositions to industry: a taper of ¾-in. per ft. for all sizes, and a compromise, with Morse taper for smaller sizes and ¾-in. taper for larger sizes. The committee on designation and working ranges of machine tools held its first meeting Dec. 5, with H. W. Dunbar, Norton Co., Worcester, chairman. Mr. DuBrul, reporting for the committee, pointed out that the grinding machine group of the N. M. T. B. A. has been working on this for a number of years and has standardized on many classes of grinders. Milling machine, lathe and other groups have also worked along this line.

Standardization of chucks and chuck jaws will be taken up by a technical committee headed by J. R. Lovely, Jones & Lamson Machine Co., Springfield, Vt. The committee, composed largely of chuck manufacturers, is made up of two sub-committees, one on scroll chucks and the other on air chucks. Another sub-committee will take up bolt holes on air cylinders, end connections on piston rods, etc. The main committee is working in chuck jaw standards.

The committee on spindle noses and collets for machine tools, of which J. B. Armitage, Kearney & Trecker Corporation, Milwaukee, is chairman, reported progress. S. Diamant, president of the Diamant Tool & Mfg. Co., Newark, N. J., is permanent chairman of a committee on punch and die holders, and a committee on circular forming tools is being organized with T. A. Anglada, Anglada Motor Corporation, New York, chairman. This standardization project was suggested by the S. A. E.

Simplification and standardization of drill sizes is to be undertaken by a committee headed by C. J. Oxford, National Twist Drill Co., Detroit. At the first meeting, held Dec. 5, a subcommittee was appointed to prepare a tentative list of drill sizes. A drill jig bushing committee, with C. E. Rundorff, Buick Motor Co., Flint, Mich., chairman, has also been organized.

Standardization of machine tool colors and paint materials was suggested for consideration by the sectional committee, this project being introduced by E. F. DuBrul. After some discussion as to whether the project is within the scope of the committee, it was voted to refer the matter to the American Standards Association. Standardization of location of serial numbers on machine tools was also suggested.

The consensus of opinion was that this project does not come within the scope of the committee and it was voted to refer the matter to the N. M. T. B. A. Standardization of dies for electric spot welders was suggested by R. S. Burnett, manager standards department of the S. A. E., at the request of a large maker of motor trucks. Users of such equipment are to be circularized and if a substantial interest is found, the executive committee will add this to the list of standardization projects. Butt, as well as spot, welding dies will be included.

Julian Kennedy Awarded A.S.M.E. Medal

Julian Kennedy, Pittsburgh, was awarded the A.S.M.E. medal for 1928 for "services and contributions to the iron and steel industry." The presentation was made as a feature of the dinner of the American Society of Mechanical Engineers, New York, Dec. 5. He was presented to the members for the award by Charles M. Schwab, past-president of the society, and the actual presentation of the medal was made by President Alex Dow. Mr. Kennedy, in an interesting acceptance speech, which recounted some of the conditions which used to obtain in the industry, emphasized something of the difficulties, particularly in the early days, of introducing new methods of equipment into the mills, saying that "it was harder to get them in use than to work them out."

Scrap Institute Holds First Meeting and Dinner

The first meeting and dinner of the recently organized board of directors of the Institute of Scrap Iron and Steel was held Dec. 5, at the Hotel Pennsylvania, New York. Announcement was made by Benjamin Schwartz, director of the Institute, of the organization of arbitration machinery to settle disputes within the iron and steel scrap industry, available to members and non-members upon application for the service. The rules adopted conform to the arbitration laws of the State of New York and other states which have passed such statutes and were prepared with the aid of the American Arbitration Association. According to these rules, the director of the Institute will be the impartial chairman in every arbitration, two arbitors being selected from a fixed panel by the parties to the dispute.

In addition to the seven chapters of the Institute already organized in Pittsburgh, Buffalo, Philadelphia, New York, Newark, N. J., Reading, Pa. and Hartford, Conn., it was decided to establish new chapters in Cleveland, Detroit, Chicago, St. Louis and Boston. The board of directors also voted to organize four departments of service devoted to trade relations, arbitration, insurance and traffic.

At the dinner, Dr. Hugh P. Baker of the Chamber of Commerce of the United States, Washington, spoke on trade associations and their growth in the United States, explaining how the trade association department of the Chamber of Commerce of the United States is extending aid to recently organized associations.

The following officers were elected to serve until the annual meeting in March: Joseph G. Hitner, Henry A. Hitner's Sons Co., Philadelphia, president; David Strauss, Continental Iron & Steel Co., New York, B. Cohen, Louis A. Cohen & Sons, Wikes-Barre, Pa., Stanton Dreifus, S. Snyder Corporation, New York, J. V. S. Bishop, Bishop Co., Philadelphia, and David Pollock, Mayer Pollock, Pottstown, Pa., vice-presidents; Herman D. Moscowitz, M. Samuel & Sons, New York, secretary, and Thomas F. Kelly, Brooklyn, treasurer.

The executive committee includes: Max Meltzer, Hausman & Wimmer Co., Pittsburgh; Michael Bonomo, L. Schiavone & Bonomo Brothers, Jersey City, N. J.; Allan Hoffer, Allan Hoffer Co., Philadelphia; N. Jacobs, Buffalo House Wrecking & Salvage Co.; I. Wilkoff, Wilkoff Co., Youngstown, and Morris Spear, Rotter, Spear Co., Cleveland.

Machinery Markets and News of the Works

December Business Lighter

Machine Tool Buying Affected by Year-End and Holiday Considerations—Outlook Still Promising

MACHINE tool buying this month has declined in all markets. Although the volume of inquiry has dropped off along with a reduction in sales, the outlook continues promising for good business early in the new year. Year-end inventory considerations, the approach of the holidays and the desire of many manufacturers to await the new year for the formulation of business plans are perhaps responsible for the check in purchases.

It is apparent that the final month of this year will run ahead of December, 1927, but this comparison loses some force in view of the fact that sales throughout all of this year have outstripped those of corresponding months in the previous year.

Requirements of automobile companies in the first quarter are expected to be substantial. At Chicago, the International Harvester Co. and the Allis-Chalmers Mfg. Co. are still buying, and lists of the Buda Co. and the Whiting Corporation, both of Harvey, Ill., are active. At Cleveland, the Eaton Axle & Spring Co. is adding to recent heavy purchases.

Several hundred used machine tools have been thrown on the market at Detroit through the consolidation of Dodge Brothers with the Chrysler Corporation. The old equipment is being disposed of to balance production.

An order for 10 turret lathes for a manufacturer in Sweden was placed with a Cleveland builder.

New York

NEW YORK, Dec. 11.—Inquiries for machine tools continue in fair volume, although scattered and for the most part for single tools. An inclination to delay buying until next year is beginning to develop in some cases. Except for the purchase of a few tools by the New York Central Railroad, including two upright drills, the railroads are inactive. The General Electric Co. has closed on several tools including three 12-in. engine lathes for use at Schenectady. No action has been taken as yet on the list of 16 tools for the Department of Public Instruction, Schenectady, N. Y. With shipbuilders bidding for the construction of more tonnage than for a number of years, some sellers of machine tools foresee the possibility of small business from this source in lathes, planers, drills and milling machines.

Post Radio & Electric Corporation, New York, has leased space in building at 135 Bleecker Street, to manufacture radio equipment and apparatus.

Weihl Brothers, Brooklyn, care of Tobias Goldstone, 26 Court Street, architect, have asked bids on general contract for new foundry, to cost about $27,000 with equipment.

Board of Education, 500 Park Avenue, New York, is said to be planning installation of manual training department in three-story John Adams High School to be erected at Woodhaven, L. I., to cost about $2,000,000, for which bids have been asked on general contract. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Bushwick Can Co., 86 Butler Street, Brooklyn, manufacturer of tin cans and boxes, etc., has awarded general contract for one-story factory, to cost about $45,000 with equipment. V. A. Lacerenza, 26 Court Street, is architect.

Anaconda Copper Mining Co., 25 Broadway, New York, has plans for two central power plants for mining properties in Butte, Mont., district, replacing a number of stations now used for this service.

James W. Garside, president, DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., and associates, have organized Jenkins Television Corporation, with capital of $10,000,000, to manufacutre television and radio equipment and devices. Company will take over Jenkin's Laboratories, Inc., Washington, manufacturer of motion picture projectors, and equipment for transmission of motion pictures by radio or wire. It is understood that plant will be established in New York district. Mr. Garside will be president and general manager; C. Francis Jenkins is vice-president in charge of research. Company has arranged for stock issue to total $2,500,000, portion of fund to be used for development.

Port of New York Authority, 75 West Street, New York, will soon begin superstructure for new multi-story testing laboratory for structural steel and other steel products in connection with proposed Hudson River bridge, between Fort Lee, N. J. and Fort Washington Park, and bridge over Kill van Kull, between Bayonne, N. J., and Port Richmond, S. I. It will be located at West Side Avenue and Fox Place, Jersey City, N. J., and will cost about $300,000 with equipment.

Eastern New Jersey Power Co., Asbury Park, N. J., operated by Utilities Power & Light Corporation, 327 South La Salle Street, Chicago, has acquired 45 acres at Sayreville, N. J., and plans new steam-operated electric power plant with initial capacity of 60,000 kw., to cost about $5,000,000 with turbo-generators and auxiliary equipment. Later capacity will be increased to 180,000 kw. A coal storage plant of 60,000 tons capacity, with mechanical handling facilities, will be provided.

U. S. Hammered Piston Ring Co., 1222 South Grove Street, Irvington, N. J., has plans for new works near Paterson, N. J., for production of piston rings for aircraft engines, to cost more than $350,000 with equipment. It is understood that present works will be removed to new location. Company has work under way on new plant at St. Petersburg, Fla., for production of piston rings for automobile engines. Sale of stock amounting to $800,000 has been arranged, portion of fund to be used for expansion. Albert W. Wenzel is president.

Metals Disintegrating Co., Townley, near Elizabeth, N. J., has approved plans for two-story and basement addition, 53 x 100 ft., to cost about $40,000 with equipment. William L. Finne, 91 Broad Street, Elizabeth, is architect.

National Aero Corporation, care of Perth Amboy Airplanes Corporation, Market Street, Perth Amboy, N. J., has leased plant of last-noted organization, now in course of construction, for manufacture of air-cooled aircraft motors, including parts and assembling departments. Buildings are scheduled for completion early next year and will provide about 50,000 sq. ft. floor space. National company was formed recently with capital of $1,000,000 and is headed by Everett S. Cameron, president, and Eldridge M. Roberts, secretary.

Koppen Metal Products, Inc., formerly at Union City, N. J., is now located in new plant at Carlstadt, N. J., and may be addressed at P. O. Box 37.

William H. Nicholls Co., Inc., formerly at 4 College Street, Brooklyn, has removed to Ninety-first Avenue and 126th Street, Richmond Hill, N. Y.

Severin Machinery Corporation, 30 Church Street, New York, has taken over good will and business of Severin-Strafer Machinery Corporation.

National Flue Cleaner Co., Inc., Groveville, N. J., maker of soot blowers and fire tube boilers, has appointed the following representatives: McGee Sales Agency, 75 Fremont Street, San Francisco; Flickinger, Meyers & Rudolph, 129 West Second Street, Los Angeles; Manufacturers Sales Service, Box 655 Salt Lake

The Crane Market

OVERHEAD crane buying continues small and current inquiries are in most cases for single pieces of equipment. Sellers of electric and hand power hoists report continued good demand, but no large lists. Interest in locomotive cranes has slackened with the approach of winter weather, but contractors are still in the market for power shovels for tunnel and other contracts. Standard Oil Co. of Louisiana will buy a 150-ton, 30-ft. span overhead electric crane with two 25-ton auxiliary hooks for an experimental station at Baton Rouge, La. Nashville Bridge Co., Nashville, Tenn., is planning installation of 25 ton, 60-ft. span electric traveling crane.

Among recent purchases are:

American-Chatillon Co., 393 Seventh Avenue, New York, nine small overhead cranes for Rome, Ga., six 1-ton hand power cranes with electric hoists, one 2-ton hand power crane, one 4-ton and one 6-ton crane with electric hoists, from Florandin Equipment Co., New York, agent for H. D. Conkey & Co., Mendota, Ill., and American Engineering Co., Philadelphia.

Amtorg Trading Corporation, 165 Broadway, New York, 10 50-ton locomotive cranes for export to Russia from Industrial-Brownhoist Corporation.

Missouri Pacific has ordered an overhead electric crane from Harnischfeger Corporation.

Western Electric Co., Chicago, has placed order for an overhead traveling crane with Whiting Corporation.

White Motor Crane Service, Detroit, has purchased a gasoline-operated crawler type crane from Orton Crane & Shovel Co.

City, Utah, and W. A. Ramsey, Ltd., Honolulu, Hawaii.

Lockstrip Mfg. Corporation, 36-09 Vernon Boulevard, Long Island City, N. Y., has been organized to take over manufacture of T. M. C. lockstrips for terrazzo and cement work. Plant is built and fully equipped and company is in operation.

National Cash Register Co., Dayton, Ohio, is permitted to acquire all capital stock of Ellis Adding Typewriter Co., Newark, N. J., under order of United States District Court in southern Ohio. Court held that transaction would not violate injunction decree against company granted in 1916 in Federal Government's anti-trust suit.

Gesswein Boat Corporation, Bergen Beach, Brooklyn, has been organized to operate boat building and repair works and has taken over plant of Paul S. Gesswein Boat Co. It will manufacture outboard motor boats and will be in market for equipment and supplies, including brass fastenings, lumber and deck fittings. Robert M. French is treasurer and general manager.

New England

BOSTON, Dec. 10.—The majority of local machine tool dealers report little current business. The most important transactions included four machines with an aggregate value of $35,000, four lathes and four single-spindle sensitive drills. Used tools sales included about a dozen tool room lathes, three shapers, and other equipment. Unquestionably more machine tools have been sold, but because of keen competition among dealers details are lacking. Firms which have bought equipment have more tools under consideration. A Connecticut machinery maker in November bought at least $105,000 of machine tools, a machinery maker in Rhode Island purchased heavily last month and another Rhode Island company bought three Brown & Sharpe milling machines. It is also reported that a Worcester, Mass., machinery maker placed substantial orders.

New inquiries are coming in slowly, partly because of the nearness of inventory time and also because most users needing equipment cannot secure prompt deliveries and have decided to await developments. Machine tool dealers, however, feel certain that business will be good in January and possibly in later months.

That New England plants are busier than in many months is indicated by the increase in consumption of small tools. December started with prospects of a new high monthly sales record and has kept up the pace.

Cutting Die & Machine Co. of America, a Massachusetts corporation with 25,000 shares of no par value stock outstanding, has been organized to take over business of Joseph E. Knox & Co., Inc., Lynn, Mass., O. M. Savels & Co., Worcester, John Dewes-Gumbs Die Co., New York, and Boston Die Co. and Hub Schriving Knife Co., Boston. These companies manufacture cutting dies for shoes and leather, rubber, celluloid, collars and shirts, envelopes, etc., perforating dies for shoe novelties, rubber trimming knives and extruding rubber form dies. James V. Knox, president Joseph E. Knox & Co., Inc., is president and general manager of new company. Present plants will be operated without change in management and will be expanded.

Work has started on a new plant for American Tube & Stamping Co., Stratford Avenue, Bridgeport, Conn.

Everett Auto Parts Co., 234 Everett Avenue, Chelsea, Mass., has awarded a contract for a one-story machine shop, 40 x 100 ft.

Plans are in progress for a new coal yard for John R. White & Son, Gano Street, Providence, R. I., to replace one destroyed by fire last week. Hoisting and other equipment will be required.

Brooks-Skinner Co., Adams Street, Quincy, Mass., wood and steel portable and permanent buildings, has started work on an addition. Plans for 1929 call for an increased production of about 25 per cent.

Wallace Barnes Co., Bristol, Conn., manufacturer of springs, special screw machine products, etc., is arranging an expansion program, with new buildings to total about 200,000 sq. ft. additional floor space. New unit will also be built at branch plant at Forestville, providing about 16,000 sq. ft. floor space. Project will cost over $400,000 with equipment.

American Paper Tube Co., Hazel Street, Woonsocket, R. I., has asked bids on general contract for one-story addition, to cost about $45,000 with machinery. W. F. Fontaine, 285 Main Street, is architect.

Sikorsky Mfg. Corporation, College Point, L. I., N. Y., manufacturer of airplanes and parts, will soon take bids on general contract for new plant at Lordship, Stratford, Conn., consisting of main one-story unit, 300 x 400 ft., with adjoining two-story building, 50 x 150 ft., to cost more than $400,000 with machinery. Company is said to be planning removal of College Point works to new location. Fletcher-Thompson, Inc., Bridgeport, Conn., is architect and engineer.

Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., architect and engineer, has plans for one-story automobile service, repair and garage building, 65 x 250 ft., at Norwalk, Conn., to cost about $120,000 with equipment.

Wilcox Crittenden & Co., Middletown, Conn., manufacturers of marine hardware, inform THE IRON AGE that they have not let contract to Lockwood Greene Engineers, Inc., for plant addition, as reported in our issue of Nov. 15.

Philadelphia

PHILADELPHIA, Dec. 10.—Contract has been let by Atwater Kent Mfg. Co., Philadelphia, to William Steele & Sons Co., for one-story sawtooth roof addition, with part three stories, 515 x 900 ft., to cost over $1,000,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Thomas Halton's Sons, Mascher Street, Philadelphia, manufacturers of silk mill machinery, parts, etc., have awarded general contract to E. E. Hollenback, Inc., 1910 North Marshall Street, for one-story machine shop, 69 x 240 ft., to cost more than $100,000 with equipment. W. E. S. Dyer, Land Title Building, is architect and engineer.

Philadelphia Air Terminal, Inc., care of Andrew S. Webb, president, S. B. & B. W. Fleisher, Inc., Twenty-fifth and Reed Streets, Philadelphia, recently organized by Mr. Webb and associates, has acquired 125 acres at South Philadelphia as site for new airport, to consist of hangars, machine and repair shops, oil storage and other units, project to cost about $2,500,000.

Philadelphia Nonferrous Foundry Co., Philadelphia, recently organized by Edward W. Taylor, Jr., 3030 Queen Lane, and associates, has acquired two-story factory at 811-15 Fairmount Avenue, 56 x 125 ft., for production of aluminum, brass and other metal castings.

Pennsylvania Flexible Metallic Tubing Co., Broad and Race Streets, Philadelphia, has asked bids on general contract for an addition to plant at Seventy-third Street and Elmwood Avenue, to cost over $50,000 with equipment. William H. Cookman, 420 West Price Street, is architect.

Crew Levick Co., 219 North Broad Street, Philadelphia, refined oils, gasoline, etc., will rebuild part of refining still department on Pettys Island, Delaware River, destroyed by fire Dec. 4.

American Dredging Co., foot of Division Street, Camden, N. J., has acquired waterfront property at Gloucester, N. J., and plans construction of new barge and dredger shipyard, primarily for repairs to

company equipment, including general mechanical works, one-story machine shop, and marine drydock railroad, to cost over $150,000 with equipment. Present works will be removed to new location and capacity increased.

T. J. Cope, 2114 Sansom Street, Philadelphia, manufacturer of electrical equipment, has purchased two-story factory on site, 41 x 110 ft., for new plant.

Board of Education, Allentown, Pa., is said to be planning installation of manual training equipment in three-story addition to Raub junior high school, to cost $200,000, for which plans will be drawn by Jacoby & Everett, Commonwealth Building, architects.

York Heating & Ventilating Corporation, Sixteenth and Sansom Streets, Philadelphia, manufacturer of heating and ventilating equipment, is considering new plant unit at Bridgeport, Pa., to cost about $50,000.

Hobson Flatware Co., Lansdale, Pa., manufacturer of nickel-plated and chromium-plated ware, has awarded general contract to Bailey Brothers, Doylestown, Pa., for new plant on 3-acre tract at Lambertville, N. J., recently acquired, consisting of two units, one story, 120 x 160 ft., and two stories, 40 x 160 ft., to cost more than $75,000 with equipment.

Pennsylvania Forge Co., Philadelphia, has removed main office to new plant at Milnor and Bleigh Streets, Tacony, Philadelphia.

Hindley Gear Co., Philadelphia, has removed offices and shop from 1105 Frankford Avenue, to 508 North Nineteenth Street.

Art Metalabel Corporation, Baptist Avenue and Pennsylvania Railroad, York, Pa., has been organized to manufacture metal seals and name plates. Company has leased manufacturing building and initial materials have been purchased. Production is expected to begin first of year.

Pittsburgh

PITTSBURGH, Dec. 10.—Machine tool sales are in smaller volume than in November, which is not unusual at this time of year when the tendency among buyers is to let purchases go over into a new year. Prices are out on many inquiries and it is believed that the majority will materialize into orders.

Property has been acquired at Meadville, Pa., by Erie Railroad Co., 50 Church Street, New York, for new locomotive terminal, including mechanical coaling plant and other facilities, to cost about $150,000.

Mackintosh-Hemphill Co., foot of Twelfth Street, Pittsburgh, manufacturer of rolling machinery, parts, etc., has awarded general contract to Hughes-Foulkrod Co., Schoff Building, for one-story unit at Wooster, Ohio, to cost about $80,000 with equipment.

Standard Seamless Tube Co., 313 Sixth Avenue, Pittsburgh, is said to have plans under way for addition to mill at Ambridge, Pa., to cost over $350,000 with equipment. H. M. Wharton is company engineer.

Sinclair Glass Co., Vanvoohis, W. Va., manufacturer of automobile and flashlight lenses, etc., has leased building at Huntington, W. Va., totaling about 50,000 sq. ft. floor space, for new branch plant.

Armstrong Cork Co., Twenty-fourth Street, Pittsburgh, is said to be planning three-story addition to plant at Gloucester, N. J., to cost more than $75,000 with equipment. H. Boettcher is company architect and engineer.

McCoy-Brandt Machinery Co., 50 Penn Avenue, Pittsburgh, has changed name to Brandt Machinery Co.

Detroit

DETROIT, Dec. 10.—Federal Motor Truck Co., 5780 Federal Avenue, Detroit, will soon take bids for two-story addition, to cost over $200,000 with machinery. F. J. Winter, Book Tower Building, is architect.

Hutto Engineering Co., 515 Lycaste Avenue, Detroit, manufacturer of grinding machinery, has awarded general contract to H. C. Wright Building Co., Detroit, for one-story addition, to cost about $50,000 with equipment.

Continental Ice Co., 7744 Jeffery Avenue, Chicago, has plans for new two-story ice-manufacturing and refrigerating plant, 85 x 340 ft., at Port Huron, Mich., to cost more than $175,000 with machinery.

Muskegon Motor Specialties Co., Muskegon, Mich., recently organized to take over company of same name and L. O. Gordon Mfg. Co., both with local plants, specializing in production of cam shafts for internal combustion engines, has arranged for a stock issue of about $1,943,000, part of proceeds to be used for merger and expansion in production.

City Council, Cadillac, Mich., has secured tract of 160 acres for municipal airport, and plans early construction of hangars, machine and repair shop, oil storage building and other units.

Robinson Marine Construction Co., West Main Street, Benton Harbor, Mich., has awarded general contract to M. W. Stock Construction Co., St. Joseph, Mich., for branch ship repair yard at St. Joseph, consisting of two units, 50 x 100 ft., and 50 x 65 ft., and auxiliary structures, to cost about $70,000 with equipment.

Defender Mfg. Co., Allegan, Mich., manufacturer of automobile bumpers, has authorized an expansion program to double present capacity, to cost about $50,000 with equipment.

Foster Airways, Inc., Lafayette Building, Detroit, is considering extensions in airport near Dearborn, Mich., including construction of additional hangars and mechanical buildings, to cost about $150,000. F. M. Foster is president.

Consumers Power Co., Jackson, Mich., has arranged for a bond issue of $11,415,000, part of proceeds to be used for expansion and improvements.

City Council, Allegan, Mich., has completed plans for municipal hydroelectric generating plant on Kalamazoo River, to cost about $400,000 with transmission system, and is said to be planning early call for bids. Ayres, Lewis, Morris & May, Cornwall Building, Ann Arbor, Mich., are engineers.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of two and four-wheel motor trailers, has awarded general contract to Edward Butler, Detroit, for two additional stories on present factory, to cost more than $85,000 with equipment.

La Salle Tool & Gauge Co., Inc., 1310 Maple Street, Detroit, has been organized to manufacture jigs, fixtures, fine tools and gages. At present manufacturing will be done by contract and later company will be in market for additional machinery and equipment. Charles F. Lau is general manager.

Cleveland

CLEVELAND, Dec. 10.—While machine tool sales show a little slowing down this month, December has started with an exceedingly good volume of business. There was considerable scattered buying of single machines in the northern Ohio territory during the week. An export order for 10 turret lathes for Sweden was placed with the Warner & Swasey Co. by a large electrical manufacturing company in that country. The Eaton Axle & Spring Co., Cleveland, which recently was a heavy buyer of machinery, has some additional equipment to place. The Murray Ohio Mfg. Co., Cleveland, during the week purchased a large toggle drawing press. The volume of business in presses recently has been heavy, although orders mostly are for single machines.

The merger of Dodge Brothers plant in Detroit with the Chrysler Corporation has resulted in the placing on the market of several hundred used tools in the Dodge plant, which are being disposed of with a view of balancing production. This surplus machinery is being offered by a Detroit dealer.

Swartwout Co., Cleveland, has purchased plant of Cleveland Milling Machine Co., 18511 Euclid Avenue, part of which it has been occupying as a tenant, and will shortly occupy entire plant, providing 90,000 sq. ft. of floor space and covering a 7-acre site. Company has moved to Cleveland business of S-C Regulator Co., Fostoria, Ohio, which it has purchased, and plans in the next few months to move its Orrville, Ohio, plant to Cleveland, thereby centralizing its production at one point. Company's products include industrial ovens and ball bearing ventilators. D. K. Swartwout, Sr., is president; D. K. Swartwout, Jr., vice-president, and W. E. Clement, secretary and treasurer.

Ideal Bronze Co., 1265 East Fifty-fifth Street, Cleveland, has been consolidated with Wellman Bronze Co., 6017 Superior Avenue, Cleveland, giving latter company an annual capacity of 2,000,000 lb. of rough, finished and semi-finished bronze and aluminum castings. Plant of Ideal company will be closed. F. H. Zwilling, president-treasurer and E. V. Coulston, secretary of Ideal company, have become associated with Wellman organization.

W. S. Tyler Co., Cleveland, has acquired a 15 acre site at St. Catherine's, Ont., for erection of a plant to supply its Canadian trade. Company's products include woven wire screens, ornamental wire and bronze.

National Lamp Works of General Electric Co., Nela Park, Cleveland, is planning one-story addition, 80 x 100 ft., to cost about $50,000 with equipment.

National Acme Co., Coit Road and East 131st Street, Cleveland, manufacturer of automatic screw machines, etc., is said to be planning one-story addition to cost over $75,000 with equipment.

City Board of Control, Akron, Ohio, has authorized immediate construction of new municipal airport, to cost more than $750,000 with hangars, repair and reconditioning shops and other units.

Lee Krueger, president, Superior Holding Co., Fidelity Building, Cleveland, has approved plans for two-story automobile service, repair and garage building, 65 x 150 ft., to cost about $150,000 with equipment.

Board of Education, Fremont, Ohio, is said to be planning installation of manual training equipment in new two-story junior high school, to cost about $225,000. S. H. Shively, Logan Block, is architect.

Cincinnati

CINCINNATI, Dec. 10.—Machine tool bookings have declined somewhat in the past week and indications are that business in December will fall considerably short of that in each of the three previous months. However, the flow of orders has been fairly substantial and the month is certain to make a better showing than December, 1927. The volume of inquiries has slackened, but still holds up to a good level. Although sales in the Detroit district have fallen off, automobile companies are buying some equipment, and their requirements in the next few months are expected to reach large proportions.

Machine tools executives are of the opinion that purchases of tools are likely to be only fair until after the holiday season. Local plant operations have been well sustained and in some cases night shifts are necessary to satisfy demand for reasonably early deliveries.

A Philadelphia company is in the market for six 24-in. and four 20-in. lathes. A Cincinnati builder has taken an order for two engine lathes to be shipped to Persia. The Norfolk & Western is reported to have bought additional tools on its recent list, but the Southern has not yet closed on its inquiry.

G. & G. Mfg. Co., 3116 Spring Grove Avenue, Cincinnati, manufacturer of dies, stamps, etc., has acquired property, 85 x 100 ft., heretofore held by Hilbert Machine Co., and will remodel for new plant. Adjoining site has been secured for an addition.

National Cash Register Co., Dayton, Ohio, has taken bids on general contract for addition to plant No. 2, to cost about $30,000.

Union Gas & Electric Co., Fourth and Plum Streets, Cincinnati, is having plans drawn for a new steam power plant, to cost about $1,500,000, with equipment, pipe lines, etc. Columbia Engineering & Management Corporation, 61 Broadway, New York, is engineer.

Sparta Spoke Works, Sparta, Tenn., has begun work on new one-story plant, to cost about $45,000 with machinery.

Mengel Co., Louisville, operating Mengel Body Co., manufacturer of automobile bodies, has arranged for new stock issue to total about $2,000,000, a portion of fund to be used for expansion at Louisville and branch mill at Baton Rouge, La.

Officials of Mead Pulp & Paper Co., Chillicothe, Ohio, have organized a new subsidiary, to be known as Harriman Co., to construct new paper mill at Harriman, Tenn., to cost over $800,000 with machinery. Mead Fiber Co., Kingsport, Tenn., another subsidiary, has work under way on expansion program to cost more than $150,000.

Memphis Natural Gas Co., Memphis, Tenn., is disposing of a stock issue to total about $1,000,000, part of fund to be used for pipe line construction and other work. Company is building 210 mile line from Monroe, La., gas fields to Nashville and vicinity.

Board of Education, Middletown, Ohio, is said to be planning installation of manual training equipment in new junior high school, to cost about $400,000, for which bids are being asked on general contract until Dec. 18.

Board of Trustees, Wilberforce University, Wilberforce, Ohio, is asking bids until Dec. 27 for power plant, 50 x 85 ft., to cost about $100,000 with equipment. H. B. Briggs, Ohio-Hartman Building, Columbus, is architect.

McCarthy-Jones & Allen Co., Inc., 111 First Avenue, South, Nashville, Tenn., has been appointed distributer for the Botfield Refractories Co., Philadelphia.

Chicago

CHICAGO, Dec. 10.—Further recession in machine tool buying is noted, but the tone of the market is still encouraging in view of the fact that business in the last month of the year is usually far below the present volume. So far in December purchases are well ahead of a year ago for the corresponding period. Inquiry is active, but from an ever widening circle of miscellaneous users.

A local specialty manufacturer has ordered six presses and a general machine shop has purchased three radial drills and two lathes. A maker of builders' hardware has bought a 14-in. x 6-ft. cone-head lathe. List for Buda Co. and Whiting Corporation, both of Harvey, Ill., are active and Allis-Chalmers Mfg. Co., and International Harvester Co., continue to buy equipment. Prices for good second-hand machine tools are higher and the supply is inadequate for current demand.

Illinois Tool Works, 2501 Keeler Avenue, Chicago, will build an addition, 120 x 120 ft. to cost $40,000. P. Jenkins, 400 North Michigan Avenue, is architect.

Mount Vernon Furnace & Mfg. Co., Second and Watson Streets, Mount Vernon, Ill., has awarded general contract to W. N. Atkinson, 114 North Johnson Street, for one-story addition, largely for enameling, to cost about $50,000.

Fox River Valley Boat Co., McHenry, Ill., J. J. Rothermel, manager, has approved plans for new two-story boat-building and repair works, 50 x 65 ft., to cost about $30,000 with equipment.

Sprague Iron Works, 4400 Addison Street, Chicago, has asked bids on general contract for a one-story addition, to cost more than $35,000 with equipment. E. G. Johnson is company engineer in charge.

Common Council, Coggan, Iowa, has authorized installation of a municipal electric light and power plant, including 600-hp. Diesel engine unit and auxiliary equipment.

Board of Education, Virginia, Minn., plans installation of manual training equipment in new junior high school to cost $500,000, for which bids have been asked on revised plans. J. A. Codding, First National Bank Building, is architect.

Greenlee Brothers, Inc., Twelfth Street, Rockford, Ill., manufacturer of woodworking machinery, saws, etc., has awarded general contract to John M. Anderson, 1235 Jackson Street, for one-story foundry addition, 120 x 350 ft., to cost over $75,000 with equipment.

City Ice & Fuel Co., Cleveland, has merged with Continental Ice Co., 33 South Clark Street, Chicago, with plants in Illinois, Iowa, Michigan and other states. Work has been started on additions to plants of Continental company at Oakwood and Port Huron, Mich., to include installation of new machinery.

South Atlantic

BALTIMORE, Dec. 10.—Bids will soon be asked by Joseph E. Sperry, Calvert Building, Baltimore, architect, for six-story automobile service, repair and garage building, to cost $500,000 with equipment.

Draper Corporation, Hopedale, Mass., manufacturer of cotton mill machinery, will soon take bids for two-story branch mill, 100 x 265 ft., at Spartanburg, N. C., to cost over $65,000 with equipment. J. E. Sirrine & Co., Greenville, S. C., are architects and engineers.

B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires and other rubber goods, has purchased Martha Mills, Thomaston, Ga., for branch plant. Plans are under way to treble capacity, to cost more than $2,000,000 with machinery. T. G. Graham is vice-president in charge.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, is considering extensions and improvements in branch oil refinery at Brunswick, Ga., to cost more than $350,000 with equipment.

Commercial Mfg. Co., Athens, Ga., recently organized by T. M. Tillman, Athens, and associates, plans early operation of local factory to manufacture store fixtures, show cases and kindred products.

Board of Directors, McDonough School for Boys, Pikeville, Md., has authorized rebuilding of school, recently destroyed by fire, to cost more than $400,000. Manual training department is planned. William H. Emery, 18 East Lexington Street, Baltimore, is architect.

L. E. Martin, president, Dominion Land & Development Corporation, Times-Despatch Building, Richmond, Va., is at head of project to establish and operate new plant for production of wood alcohol and wood-chemical products. Inquiries are being made for equipment.

King Hardware Co., Atlanta, Ga., will soon begin construction of a new storage and distributing plant at Buckhead, to cost over $50,000 with equipment. Work will be carried out in name of King Holding Co., an affiliated organization. A. Ten Eyck Brown, Atlanta, is architect.

Shenandoah Valley Canning Corporation, Harrisonburg, Va., is planning enlargements and installation of additional machinery. It is also contemplating new branch plant for vegetable canning, to cost about $50,000 with equipment. C. E. Dovel is general production manager.

Buffalo

BUFFALO, Dec. 10.—Michael Hayman & Co., 856 East Ferry Street, Buffalo, metal products, have awarded general contract to H. F. Stimm, Inc., Ellicott Square, for one-story foundry addition, to cost about $25,000 with equipment. N. H. Study, Prudential Building, is engineer.

C. M. Keys, head of Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, and associates, have organized North American Aviation, Inc., with capital of 2,000,000 shares of stock, to operate aircraft properties, including purchasing of interest in going airplane and airplane motor companies. New organization has arranged for sale of stock to total $30,000,000, part of fund to be used for initial operations. Mr. Keys is head of new company.

Sprague-Sells Corporation, 523 Cornwall Avenue, Buffalo, manufacturer of canning

and other machinery, has merged with John Bean Mfg. Co., San Jose, Cal., manufacturer of kindred equipment, agricultural machinery, etc., under last-noted name. In addition to Buffalo plant, Sprague-Sells Corporation has branch factories at Hoopeston, Ill., and Hayward, Cal. Expansion is planned. John D. Crummey is head of John Bean company.

Universal Wireless Communication Co., care of G. Morton Wolfe, 1377 Main Street, Buffalo, architect and engineer, has plans for new radio station at Scobeyville, N. J., to cost about $100,000 with power equipment. Company also plans construction of series of such stations in different parts of country, with second plant now projected at Philadelphia, to cost about $125,000.

Michel Presutti, 1152 La Salle Avenue, Niagara Falls, N. Y., and associates, have organized La Predow Construction Co., to operate local plant to build and repair barges, trucks, etc.

Plant and equipment of former Standard Turbine Corporation, Scio, N. Y., will be sold at public auction Dec. 20 by Industrial Plants Corporation, New York. Equipment includes lathes, shapers, planers, milling machines, drills, cranes, boring mills, turbines, generators, etc.

Emil Steinhorst & Sons, Inc., Utica, N. Y., maker of sheet metal products, has arranged for purchase of Kendall mill property for expansion.

Gulf States

BIRMINGHAM, Dec. 10.—Plans are under way by American Cast Iron Pipe Co., Birmingham, for one-story addition to foundry, reported to cost over $45,000 with equipment.

Lufkin Ice Co., Lufkin, Tex., has plans for a one-story addition to cost about $100,000 with machinery.

Board of Education, San Antonio, Tex., is considering installation of manual training equipment in new two-story junior high school to cost $125,000. Morris & Noonan, Builders' Exchange Building, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, is completing plans for new factory branch and distributing plant at Jacksonville, Fla., to cost about $300,000 with equipment. Mark & Sheftall, Jacksonville, are architects. Company is also having plans drawn for a branch at Fort Lauderdale, Fla., to cost about $35,000. H. S. Harvey, Guaranty Building, West Palm Beach, Fla., is architect for latter building.

State Building Commission, New Capitol Building, Jackson, Miss., is having plans drawn for new power plant at Alcorn Agricultural and Mechanical College, Alcorn, to cost about $40,000 with equipment. Bids to be taken in January. Claude H. Lindsley, Lamar Life Building, Jackson, is architect.

Texas Corporation, Houston, Tex., has authorized construction of new oil refinery on 75-acre tract at El Paso, Tex., to cost over $650,000 with equipment. Storage and distributing facilities will be provided.

Board of Works, Jacksonville, Fla., has begun construction of municipal repair and equipment shops, including two one-story units, to cost about $55,000. One building will be equipped as machine shop.

Central Power & Light Co., San Antonio, Tex., is planning an expansion and improvement program during 1929 to cost about $5,000,000, including additions in generating facilities, transmission lines, power substations and other extensions.

City Council, Fort Worth, Tex., has authorized appropriation of $30,000 for extensions in municipal airport, including new hangar, 80 x 160 ft., with repair facilities, for which bids will soon be asked. W. G. Fuller is manager of airport.

United Public Service Co., 100 West Monroe Street, Chicago, has purchased plant of Texas Ice & Refrigerating Co., Fort Worth, Tex. Plans are under way for extensions and improvements, including construction of new refrigerating unit, to cost about $80,000 with equipment.

Automatic bottling machinery, mechanical conveying, packing and handling equipment will be installed in new two-story factory of Houston Coca Cola Bottling Co., 1210 Washington Street, Houston, Tex., 110 x 120 ft., to cost about $70,000. Company will also erect one-story automobile service, repair and garage building for motor trucks, 50 x 93 ft., on adjoining site. Alfred C. Finn, Bankers' Mortgage Building, is architect.

Pan-American Transport Co., Jacksonville, Fla., has plans for one-story automobile service, repair and garage building, to cost about $100,000 with equipment. C. B. Schoeppl, Theater Building, is architect.

Bain Beaird Co., Inc., Shreveport, La., has changed name to Beaird Corporation and removed offices from Texas and Reynolds Streets to plant on Atkins Avenue. New office building, machine shop and oxygen plant are being erected and machinery is being installed to double capacity of oxygen department. Company manufactures oxygen and acetylene gas, operates machine shop and engages in car repairing and structural steel work. J. B. Beaird is vice-president and general manager.

St. Louis

ST. LOUIS, Dec. 10.—Revised plans are being drawn by Swift & Co., Union Stock Yards, Chicago, for extensions and improvements in branch plant at South Vandeventer and Papin Streets, to cost about $500,000 with equipment.

A. & B. Spring Co., 719 West Main Street, Oklahoma City, Okla., manufacturer of steel springs, etc., is considering one-story plant unit, 75 x 140 ft., to cost more than $50,000 with equipment.

Missouri Pacific Railroad Co., Missouri-Pacific Building, St. Louis, has approved plans for power plant at Wichita, Kan., to cost about $40,000 with equipment. E. A. Hadley is chief engineer.

Arkansas Cold Storage Co., Little Rock, Ark., will soon take bids for two-story cold storage and refrigerating plant, to cost over $150,000 with machinery.

White Oak Refining Co., Tulsa, Okla., has work under way on extensions and improvements in gasoline refinery at Allen, Okla., including installation of additional equipment, to cost more than $100,000.

Gasconade River Power Co., 1015 Baltimore Avenue, Kansas City, Mo., is planning construction of hydroelectric power plant on Gasconade River in Phelps County, to cost about $250,000 with transmission line.

American Eagle Aircraft Corporation, 2800 East Thirteenth Street, Kansas City, Mo., has awarded general contract to W. K. Martin, Dwight Building, for new plant in Fairfax industrial district, consisting of one- and two-story buildings, 100 x 300 ft., and 30 x 70 ft., to cost more than $80,000 with machinery. Chester E. Dean, Reliance Building, is architect.

Commonwealth Utilities Corporation, Oklahoma City, Okla., operating electric light, power and ice properties in several States, is disposing of bond issue of $[illegible]-500,000, part of proceeds to be used for extensions and improvements.

Coffman Aircraft Co., Oklahoma City, Okla., has acquired local plant of Midland Motor Car Co. for manufacture of monoplanes. Company has also secured property of Southwest Airways Co., including flying field, and will build hangar, repair shop and other units. D. J. Marshall is president.

Barnsdall Refineries, Inc., Barnsdall, Okla., has broken ground for one-story repair shop to cost about $35,000 with equipment.

Milwaukee

MILWAUKEE, Dec. 10.—Machine tool business in the first week of December was on about the same level as that in November. Inquiry also was well maintained. Indications point to a relatively large amount of business in the immediate future. Meanwhile most tool builders are fully occupied and to complete the orders on the books of some will require 60 days or longer. The Dec. 1 labor report again shows a substantial gain in foundries and machine shops.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co., Fifth and Marquette Avenues, Minneapolis, has placed contracts for new work at its division headquarters at Ashland, Wis., to cost $400,000. Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, have been awarded contract for a new coaling shed and cinder pit, 100 ft. high. General contract for a new roundhouse, 102 x 125 ft.; a boiler house and an oil house, has been placed with Frank Tomlinson, Prentice Avenue, Ashland.

Aluminum Goods Mfg. Co., Manitowoc, Wis., which has broken ground for a seven-story addition, 115 x 302 ft., to its main plant, is having plans drawn by Lockwood, Greene & Co., consulting engineers, Chicago, for an extension of its branch works at Two Rivers, Wis., to cost $450,000.

Board of Vocational Education, Waukesha, Wis., has purchased a site on Maple Avenue for vocational training school to be built early in 1929 at a cost of $75,000 for first unit. An architect will be selected at once. H. L. Horning, president Waukesha Motor Co., is chairman of board.

Nash Sales, Inc., Broadway and East Wells Streets, Milwaukee, will build a five-story service and storage addition, 30 x 120 ft., to its present five-story headquarters building, 120 ft. sq., according to plans by M. Tullgren & Sons Co., architect, 20 Prospect Avenue. Investment will be about $80,000. Rudolf Hokanson is president.

Common Council of Racine, Wis., has engaged Alvord, Burdick & Howson, consulting engineers, Chicago, to draft plans and supervise construction of new sewage disposal plant to cost $2,500,000. Contracts will be let about Feb. 1. The project calls for extensive pumping and engine equipment, pipe, etc. Charles Beaugrand is city engineer.

Hoffmann & Billings Mfg. Co., 100 Second Street, Milwaukee, manufacturer of plumbers' and steamfitters' materials and supplies, has disposed of its jobbing business to Crane Co., Chicago, but states that it will continue manufacturing in its plant at 220 Becher Street.

Wisconsin Screw Co., Racine, Wis., maker of screw machine products, has removed its plant to larger quarters and will be in market for additional equipment.

Indiana

INDIANAPOLIS, Dec. 10.—DeLuxe Tire Co., Fort Wayne, has plans for one-story plant at Clay and Wayne Streets, 60 x 145 ft., to cost about $50,000 with equipment.

Northern Indiana Public Service Co., 112 East Wayne Street, Fort Wayne, has awarded general contract to Henry Wehrenberg & Son, 618 South Calhoun Street, for a one-story machine shop.

Marmon Motor Car Co., 1039 North Meridian Street, Indianapolis, is arranging for a new stock issue of 60,000 shares, to net about $3,000,000, a considerable part of fund to be used for expansion in production.

Chrysler Motor Corporation, Detroit, has awarded contract to Kanzler & Son, Furniture Building, Evansville, for one-story addition to motor truck plant at Evansville, to cost about $250,000 with equipment. Thole & Legeman, American Trust Building, Evansville, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to Henry Hedde, 309 Seventh Street, Logansport, for factory branch and distributing plant for motor truck division at Logansport, to cost about $55,000.

American Steel Foundries, 410 North Michigan Avenue, Chicago, has awarded general contract to Sumner-Sollitt Co., 307 North Michigan Avenue, for one-story addition at East Chicago, Ind., 75 x 100 ft., to cost about $50,000 with equipment.

Claude S. Gordon Co., Chicago, high temperature industrial engineer, on Jan. 1 will remove its Indianapolis office to 505 Merchants Bank Building.

Pacific Coast

SAN FRANCISCO, Dec. 5.—Crane Co., 836 South Michigan Avenue, Chicago, has acquired tract of 10 acres at Los Angeles, and will have plans drawn for new plant for Pacific Coast trade, to cost more than $500,000 with equipment.

Shell Oil Co., 200 Bush Street, San Francisco, has approved plans for two-story storage and distributing plant at Oakland, Cal., to cost about $200,000 with equipment. Engineering department of company is in charge.

Douglas Aircraft Co., Inc., recently organized, has taken over Davis-Douglas Co., Santa Monica, Cal., manufacturer of military airplanes. New company plans expansion in facilities, with installation of equipment for production of commercial aircraft, including parts and assembling facilities. Arrangements have been made for issue of 300,000 shares of stock.

Tacoma Utilities Department, Electric Light Division, Tacoma, Wash., J. L. Stannard, chief engineer, has authorized extensions in Cushman municipal hydro-electric power project, providing for about 30,000 hp. additional capacity, and will soon ask bids. New unit will cost about $2,000,000 with transmission lines.

City Council, Long Beach, Cal., H. S. Callahan, city manager, is considering construction of three-story municipal service, repair and garage building, to cost about $225,000 with equipment.

Lockheed Aircraft Corporation, Burbank, Cal., is arranging an expansion program at local plant and branch factory at Chicago, to include new buildings and installation of machinery. Company is planning an increase in capital from 25,000 to 150,000 shares of stock.

Wickwire Spencer Steel Co., Inc., New York, will erect warehouse at Portland, Ore., for Pacific Northwest trade, formerly handled through dealers. Building is expected to be ready for occupancy in February. W. J. Coleman is manager of branch.

Oregon Welding & Machine Works, formerly at Fifth and Glisan Streets, Portland, Ore., has moved to larger quarters at Park and Everett Streets, formerly occupied by Eureka Carriage & Auto Works. Company has purchased equipment of Eureka organization and will enlarge field of operations.

Canada

TORONTO, Dec. 10.—Replacement purchases have stimulated machine tool sales the past week or two. A strong diversified demand has developed and several small lists for half a dozen tools have been issued. Manufacturers of railroad rolling stock have made extensive purchases lately and some good orders also have been placed by automobile manufacturers, garages and repair plants.

Mundet Cork & Insulation Co., Ltd., 51 St. Lawrence Avenue, Toronto, has purchased site at corner of Booth Avenue and Keating Street for erection of a plant to cost $100,000.

Smith Brothers, 183 Duke Street, Toronto, manufacturers of truck and motor car bodies, have purchased a site at Logan Avenue and Keating Street and will erect a plant to cost $150,000.

Yardley & Co., Ltd., 358 Adelaide Street West, Toronto, manufacturer of soap, etc., has purchased a site, 100 x 233 ft., at York and Fleet Streets, Toronto, and will erect a five-story factory and warehouse to cost $200,000. General contract for construction has been awarded to De Jonckheere Construction Co., Toronto.

J. J. McSweeney, president Equitable Securities Corporation, Ltd., Montreal and Toronto, has purchased for himself and associates MacKinnon Steel Co., Sherbrooke, Que., one of Canada's leading structural steel companies, which has been owned and operated as a family concern for 20 years. It is understood that plans are under way for additions to works and equipment. Associated with Mr. McSweeney are: D. H. McDougall, director McIntyre Porcupine Mines, Ltd.; Walter G. Mitchell; J. B. Woodyatt, president Southern Canada Power Co.; John Irwin, president McColl-Frontenac Oil Co.; J. T. McCall, president Drummond, McCall & Co., Ltd.; and George D. MacKinnon, president Rutherford Lumber Co., Ltd.

Dominion Road Machinery Co., Ltd., Goderich, Ont., has started work on an addition to increase manufacturing facilities 75 per cent.

Queen City Dental Manufacturers, Ltd., 112½ Carlton Street, Toronto, contemplate erection of a new plant.

Canada Metal Co., Ltd., 29 Fraser Avenue, Toronto, has purchased a site on Fraser Avenue, 220 x 266 ft., and will erect an addition.

McColl-Frontenac Oil Co., Ltd., 114 Don Esplanade, Toronto, has purchased Bladwin Steel premises on Ashbridges Bay, Toronto, and will remodel building in spring for a refinery.

Corrugated Paper Box Co., Ltd., 189 Geary Avenue, Toronto, has awarded contract for excavations and foundations for its plant at Leaside, Ont., to John Gunn & Sons, Winnipeg. Building will be one story and basement, 180 x 700 ft. G. C. Treloar, 11 Leader Lane, Toronto, is engineer.

Electrolier Mfg. Co., 5849 Boyer Street, Montreal, has awarded contract to E. Barabe, 1442 St. Dominique Street, for a two-story factory, 70 x 94 ft., to cost $15,000.

Foreign

PLANS are being arranged under direction of Soviet Russian Government, Moscow, for extensions and improvements in iron works and smelting plant at Makeevsk to increase capacity 19 per cent. Existing works have annual output of 250,000 metric tons pig iron, 220,000 metric tons of steel, and 179,000 metric tons of rolled steel. Information regarding project at office of American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Dortmund Municipal Utilities, operated by City of Dortmund, Germany, comprising three separate interests, Dortmund Gas Co., Dortmund Water Works and Dortmund Street Railways Co., are disposing of bond issue of $3,000,000 in United States, large part of proceeds to be used for extensions and additional equipment.

German General Electric Co., Berlin, Germany, has secured concession from Government of Mexico for construction and operation of high power radio station near Mexico City, including steel towers, power plant, machine shop and other units to cost about $650,000.

Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has purchased controlling interest in Venezuelan Petroleum Co., 55 Liberty Street, and will merge its oil properties in Panama, Colombia and Venezuela with those of acquired company, which will be continued as a subsidiary. Plans are being made for increase in capital of Venezuelan company from $5,000,000 to $10,000,000, part of proceeds to be used for development of oil properties, installation of equipment, storage and distributing facilities.

A company at Helsingfors, Finland, is arranging with municipality for guarantee of loan of $1,000,000, fund to be used for construction of new warehouses and installation of elevating, conveying and other loading equipment. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 293054.

Soviet Russian Government, Moscow, has approved plans for construction of Bogomolovsk copper smelting plant near Tagil. Information at office of American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Ford Motor Co., Detroit, is planning construction of plant in Brazil to manufacture automobile tires, to be operated in conjunction with rubber plantations now being developed. A site will be selected, it is said, in vicinity of Para, near plantation base, entire project to cost more than $600,000.